Trains

February

1944

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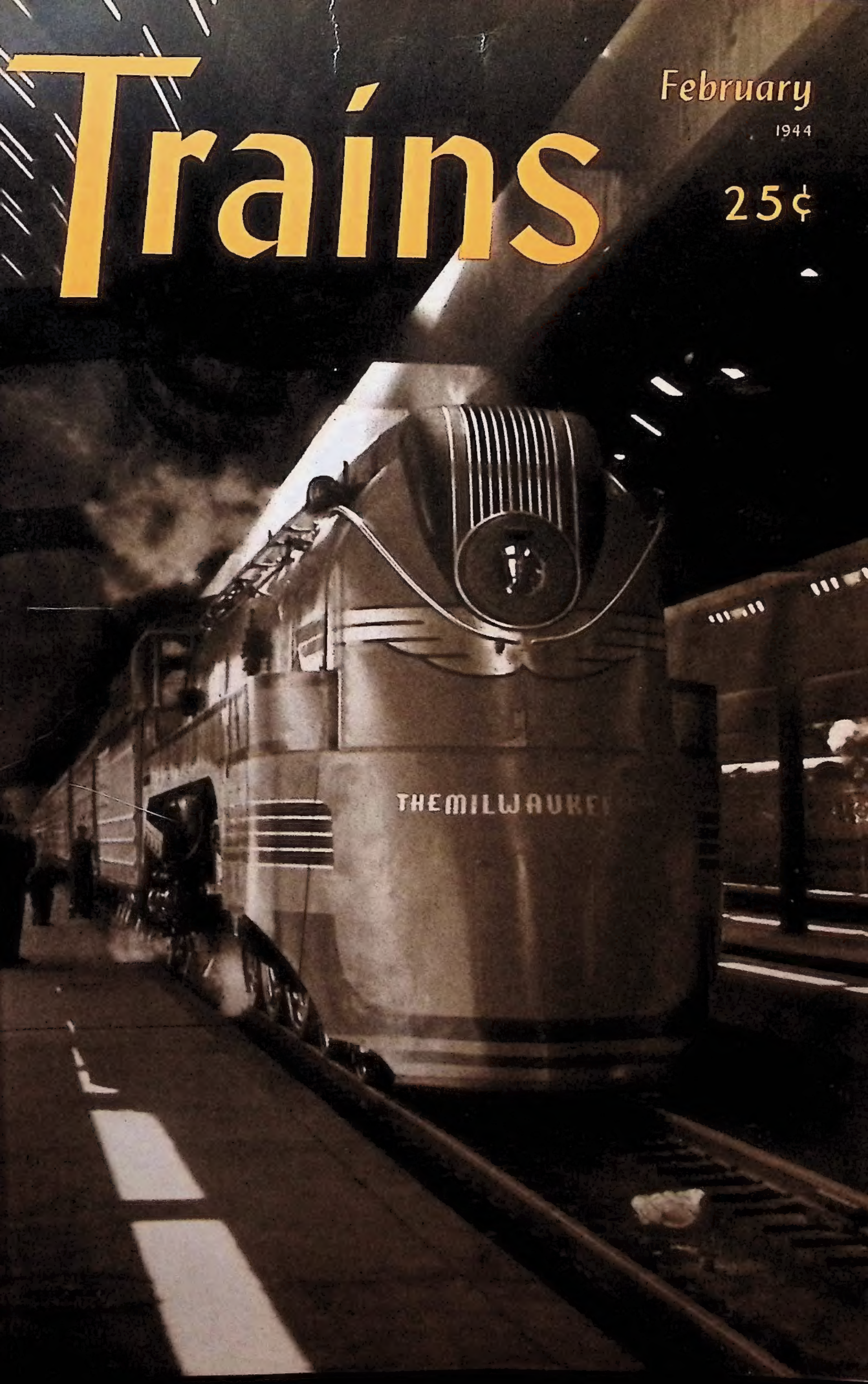

THE NATION'S GROWTH AND PROSPERITY DEPEND ON THE RAILROADS

One of the Railroads' Many Jobs

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Trains

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ANNUAL SUBSCRIPTION, DIRECT BY MAIL, $2.50
in U. S. A., Central, and South America; $3.00 elsewhere.

Entered as second-class matter Oct. 11, 1940, at the post-office at Milwaukee, Wis., under the Act of March 3, 1879.

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PUBLISHED MONTHLY BY KALMBACH PUBLISHING CO.
1027 N. 7th St. Milwaukee 3, Wis., U. S. A.

THE seizure of the railroads by the government a month ago came as a very similar measure to the government control of 1918-1919, and yet both the purpose and the effect were vastly different. The objective of government control in the First World War was stated in the order of William G. McAdoo, director general of railroads, on December 27, 1917:

"All transportation systems . . . shall be operated as a national system . . . the common and national needs being in all instances held paramount to any actual or supposed corporate advantage. All terminals, ports, locomotives, rolling stock and other transportation facilities are to be fully utilized to carry out this purpose without regard to ownership."

The railroads in late 1917 had very nearly bogged down under the unprecedented load of World War I. They had made a great effort to work together under their own Railroads' War Board but were hampered not only by their competitive tendencies but by anti-trust laws and regulatory orders designed to enforce competition. Government operation as a single national system immediately resolved these difficulties as well as provided unlimited financial backing. Whether this also meant better management has never been settled, for obviously the government management of wartime could not be compared with private management under entirely different peacetime conditions.

The performance of the railroads under private management during the past few wartime years has, however, completely removed any suspicion that government might this time do better. With O. D. T. and I. C. C. cooperation the railroads have so thoroughly integrated their operations that they are in effect a nationwide system, and yet they have retained their individual identities. This last is important, for peace will come and in peacetime it is the controlled competition of our railroads which gives us, everything considered, the most efficient railroad transport in the world.

Recognition of what has been accomplished by the railroads is implicit in the President's order of December 27, which read in part:

"The Scretary [of War] shall permit the managements of carriers taken under this order to continue their respective managerial functions to the maximum degree possible consistent with the purposes of this order. Except so far as the Secretary shall from time to time otherwise provide by appropriate order or regulation, the boards of directors, trustees, receivers, officers, and employees of such carriers shall continue the operation of the carriers, including the collection and disbursement of funds thereof, in the usual and ordinary course of the business of the carriers, in the names of their respective companies, and by means of any agencies, associations or other instrumentalities now utilized by the carriers."

A quarter-century ago the receipts of the railroads were freely mingled, and the result was a tremendous job of unscrambling and settling claims at the end of government control. This time the carriers quite clearly maintained not only their normal corporate form but their normal corporate control over receipts and disbursements. In this respect the executive order provided:

"Except so far as the Secretary shall from time to time otherwise determine and provide by appropriate orders or regulations, existing contracts and agreements to which carriers taken hereunder are parties shall remain in full force and effect. Nothing in this order shall have the effect of suspending or releasing any obligation owed to any carrier affected hereby, and all payments shall be made by the persons obligated to the carrier to which they are or may become due. Except as the Secretary may otherwise direct, dividends on stock and sinking fund, principal, interest and other distributions upon bonds, debentures and other obligations may be paid in due course, and expenditures for other ordinary corporate purposes may be made."

Perhaps the most interesting commentary on the railroad seizure was the letter from General H. H. Arnold, commanding general of the Army Air Forces, to Secretary of War Stimson—a letter dated the day after the railroads were taken over:

"The threatened general railroad strike constitutes a threat to the war effort of the Army Air Forces the seriousness of which cannot be exaggerated.

"Study of the anticipated effect of the imminent strike reveals that it would virtually paralyze the war effort of the Army Air Forces. Briefly, cessation of rail transportation would immediately stop the flow of Air Force technical supplies, stop export of drummed gasoline, exhaust aviation fuel supplies in five days thus grounding largest portion of aircraft based in U. S., and ultimately stop all air operations overseas. Routine training activities would be affected in from three to ten days, intercontinental movement of Air Forces personnel would be curtailed by approximately 75 per cent and movement of committed combat and supporting units to ports of embarkation would be curtailed instantly.

"As the railroads are presently being used to maximum capacity, any stoppage of their operation would result in a shortage of materials in aircraft production equal to the amount of the daily shipments multiplied by the duration of the stoppage, which theoretically at least could never be made up. One day's stoppage would lose the country some 300 airplanes.

"In summary, a general statement can be made that loss of domestic rail transport will effectively stop all present and proposed Air Force operations.

"H. H. ARNOLD,
General, U. S. Army.
Commanding General, Army Air Forces."

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Cover photo by John Milliken.

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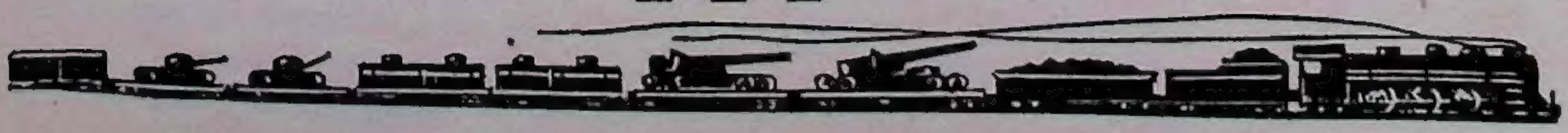


AXIS TRANSPORTATION

By Charles Layng.

ONE OF HITLER'S MISTAKES: UNDERESTIMATION OF RAILROAD'S WAR VALUE.

Reprinted with permission from NYNH&H magazine, *Along the Line.*

FORTUNATELY for our side, Hitler has made many mistakes—and one of the gravest of these was his neglect of certain features of Germany's railway system. He was of the opinion that German blitzkrieg would conquer the world before railway transportation could assume the importance in the war that it now has, and recent history testifies that he was perilously close to being right. By the complete elimination of all normal economic activities of his railways for a few months, he was able to make them serve adequately for strictly military purposes until the fall of Holland, Belgium and France was assured. Undoubtedly, Germany expected the capitulation of England soon after, but, when this did not occur, the intrinsic unsoundness of Hitler's transportation policy began to make itself felt and, more recently, now that our bombers have joined the R. A. F. in raids on German and German-controlled transportation systems, the mistake is showing up more and more glaringly every day.

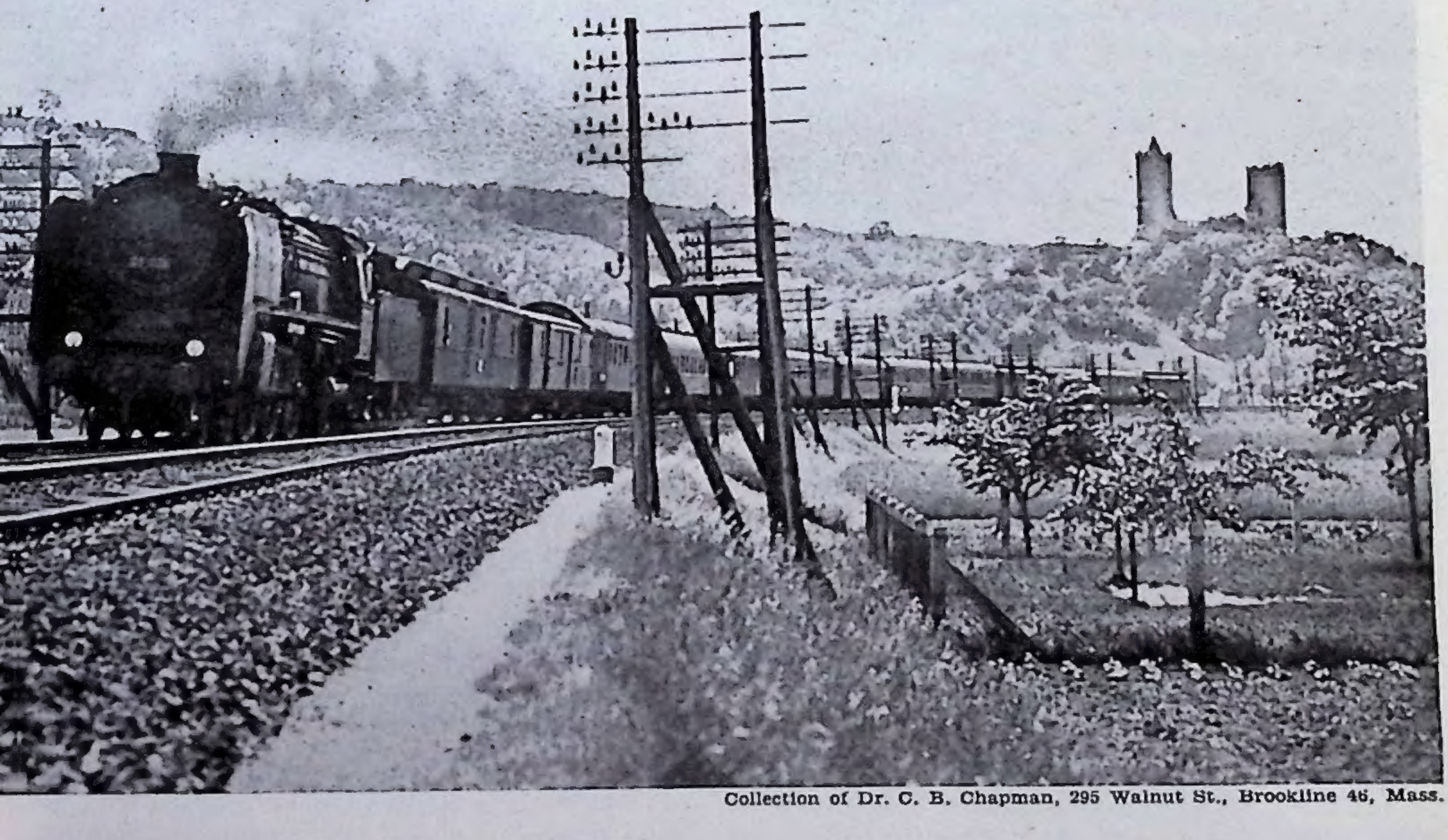
One thing that Hitler and his advisers did not seem to realize is a fact that has been amply demonstrated in this country since we entered the war. The more a war is fought in the air, and the more that cross-country tanks deliver the finishing blows on the ground, the more railway transportation is necessary to keep the all-important production lines in action by supplying that highly important fast mass-transportation of which the railways, and only the railways are capable.

That the Germans were able to come frighteningly close to conquering the world—with an inadequate transportation system—was because of two factors. First, although expansion of the railway system had been drastically curtailed in favor of broad, straight military highways leading from interior Germany to the frontiers, what rolling stock and track remained was maintained in apple-pie order. The Reichsbahn had by far the best cars and locomotives in Europe. German track was kept in first-class shape. Second, the initial successes were due to the remarkably accurate intelligence work and advance planning that enabled the Germans to know what they might expect in the way of transportation facilities in the country they next planned to invade and which permitted them to make full and almost immediate use of such facilities as soon as the territory was conquered. The staff of the German Reichsbahn was overloaded in peacetime with officers who were being trained to manage foreign railways. Let me say, however, that out of my own experience of the last several months, I can testify that warmhearted American ingenuity, even when it gets a late start, is fully the equal, if not superior to, cold-blooded German thoroughness.

Let's consider how the Germans managed to keep going at ever-accelerating speed for as long as they did. The Reichsbahn first became international in scope when the Germans

Schnellzug.

A typical prewar German Schnellzug or express train. German operation, unlike English, is on the righthand track. The track gauge is 4'-8½", the most common standard, and rolling stock is more nearly the American size than is the more restricted English equipment.



Collection of Dr. C. B. Chapman, 295 Walnut St., Brookline 46, Mass.

marched into Austria and took over the Austrian railways. When they entered Austria, they gained relatively little of value from a transportation standpoint. The state railways there, like nearly everything else in the country, had suffered from many poverty-stricken years and the supply of rolling stock was insufficient for the local needs. You may have noticed in the newspapers recently that the French Fives Lilles locomotive plant, Henschel & Sohn, of Kassel, Germany, and even the Skoda Works in far-off Prague, which manufacture locomotives as well as munitions, have all been given frequent pastings.

When Germany invaded the Sudetenland and, a few months later, took over the rest of Czecho-Slovakia, a rich prize was obtained. The Czechs not only had a modern railway system, with an ample supply of rolling stock, but they also had a number of efficient car- and locomotive-building factories.

Poland was a dead loss to the Germans as far as rolling stock was concerned. Not only was that country in the throes of almost continual car and locomotive shortages in peacetime, but, in addition, much railway equipment was destroyed by aerial bombardment and by the retreating Poles themselves, who smashed hundreds of cars and locomotives rather than allow them to fall into German hands. To operate the Polish railway system even today, the Germans have had to transfer large quantities of rolling stock from other countries.

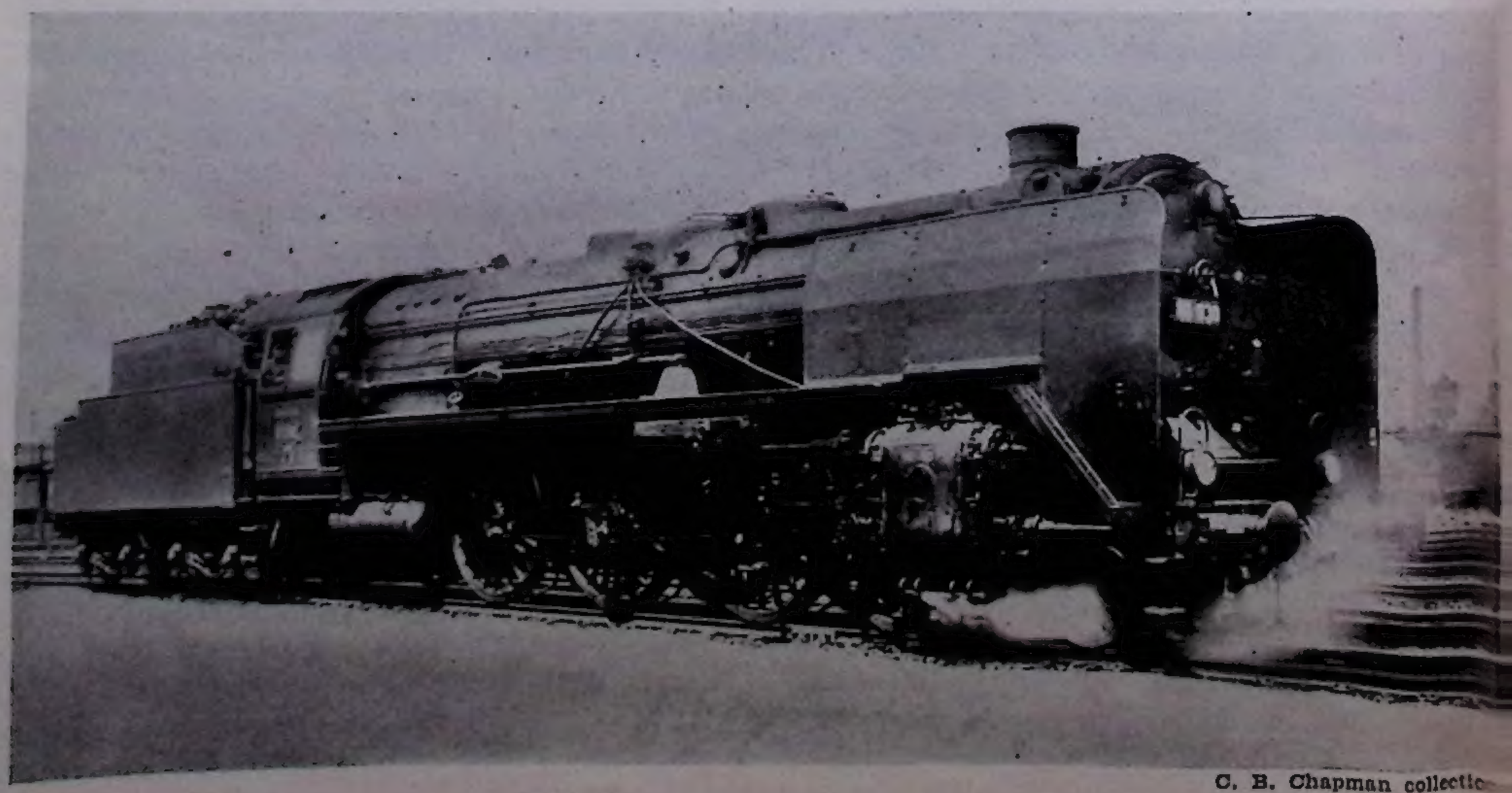
Neither Denmark nor Holland had any excess of rolling stock above their local needs, but in Holland, Belgium and France the situation was quite different. Even though the Dutch, the French and the Belgians, and particularly the latter, valiantly destroyed a surprising amount of rolling stock during their brief resistance, the Germans made a rich haul of railway materials, cars and locomotives in those countries, as well as acquiring excellent plants where new equipment could be built in quantity.

The conquest of Jugo-Slavia and Greece in 1941 added little or nothing to available rolling

stock of the Axis, as these countries were chronically short of cars and locomotives. However, as the result of conquest and of increased rolling-stock building programs in the plants of Germany, those of other Axis partners and of the occupied territories, Germany was comparatively well off from a transportation standpoint as of July 1, 1941, when the standard-gauge railways of Germany and the other Axis partners amounted to about 77,000 miles, and the narrow-gauge mileage, all in disconnected stretches, amounted to some 4100 miles. Finland must be included as an Axis partner, but the railway mileage of 2835 miles in that country consists entirely of five-foot broad-gauge track, with the exception of one short narrow-gauge line. In the occupied countries, there were 60,000 miles of standard-gauge railway and 15,200 miles of narrow-gauge line, of which 7250 miles were in France alone. Thus, some 140,000 miles of standard-gauge railway were under Axis control. At the same time, the neutral countries of the Continent operated 17,200 miles of additional standard-gauge railway, and much of this is being used in furthering the German war effort, as, for example, the Swiss railways, which are handling about 40,000 tons of coal a day between Germany and Italy, and the Swedish railways, which handle tremendous quantities of iron ore for the German steel plants.

The figures as to the number of locomotives and cars and as to their tractive effort or carrying capacity are known to us and are not particularly a military secret. However, in view of the wide differences in size of European cars and locomotives as compared to ours, the fact that some are equipped with air brakes and some are not, and because of many other factors, elaborate calculations are necessary before the ownership of rolling stock can be translated into traffic capacity. Suffice it to say that Hitler and his staff thought they had enough to take care of central and western European transportation and, at the same time, handle the knotty transportation problems of the Russian front. These are immensely complicated by the fact that all railways in Russia are of the five-foot broad-gauge. The Germans thought, however, that by advance planning they had this problem licked. Before the war there were two European change-of-gauge associations, each owning a sizable amount of cars that, with a relatively simple adjustment requiring only a short time and not involving any transfer of lading, could be fixed to operate on either standard- or broad-gauge track. As a part of the advance planning, the German Reichsbahn had acquired control of both of these associations some years prior to the war, and when the Germans invaded Russia a very high percentage of these convertible cars—several thousand of them, in fact—happened to be in German territory.

Unfortunately for the success of the German scheme, you can't run freight cars on any gauge of track without motive power, and the Russians were highly uncooperative in this respect. Nowhere was their scorched-earth policy carried out more rigorously than on railway rolling



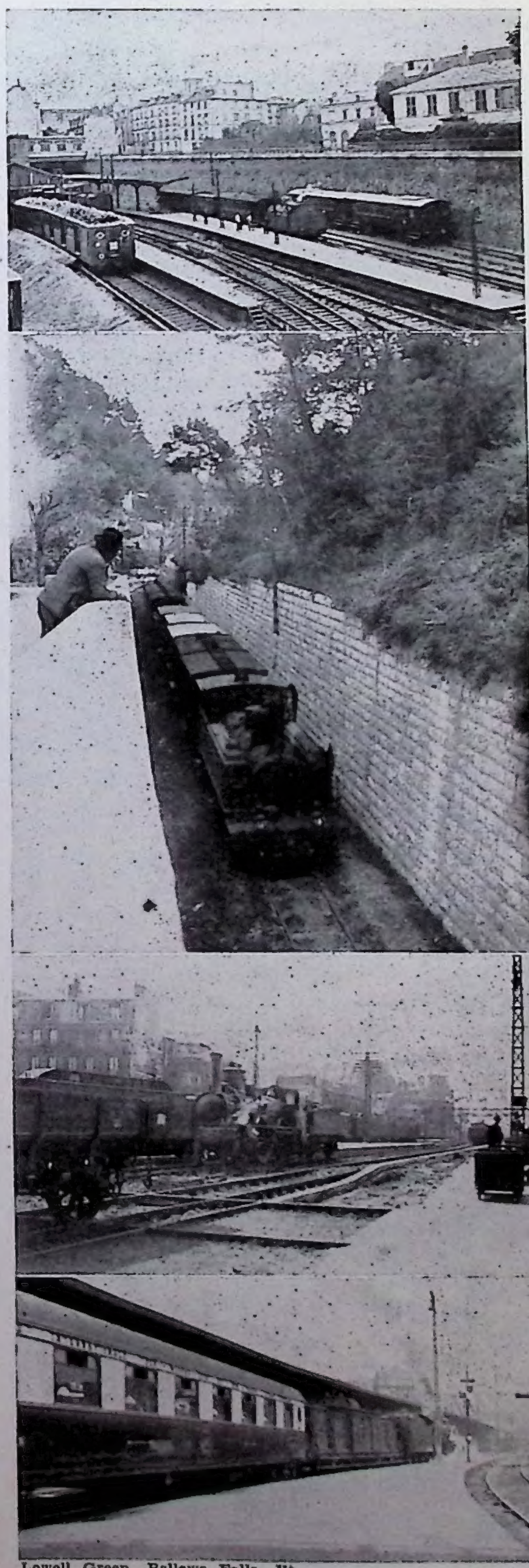
C. B. Chapman collectio

stock. What couldn't be hauled away was ruthlessly destroyed where it stood and, no matter how fast the Germans advanced, the Russians always managed to keep broad-gauge rolling stock out of their hands.

At the high tide of the German advance, before transportation bogged them down, the Germans were in possession of some 16,000 miles of Russian railways, but the supply of broad-gauge rolling stock they had been able to acquire was so meager, and highway transportation had proved so utterly insufficient to cope with the long lines of supply, that they adopted the desperate expedient of converting most of the captured 16,000 miles of railway from broad to standard gauge. And that, from the testimony of the Germans themselves, was one tough job.

They could make fairly rapid progress in good weather, by removing the spikes and other fastenings from one rail, shoving it toward the other rail 3½ inches and refastening the rail to the ties. On bridges and at switches, however, this was a slow, complicated and tedious job, and when the 1941 Russian Winter struck them and covered the tracks with snow and ice it became a terrific undertaking. The progress wasn't helped any, either, by the unwelcome attentions the rail-laying gangs received from the Russian guerillas. The track gangs had to be heavily protected and almost literally carry a spike-maul in one hand and a rifle in the other.

While they were still engaged in this activity and feverishly and vainly attempting to maintain their supply lines, the Russians struck. Largely because of failure of transport, the Germans fell back, whereupon the Russians immediately reconverted their railways back to broad gauge.



German locomotive, French scenes.

The two-cylinder express locomotive at left is typical of those used on most fast German trains before the war. With a headlight and cowcatcher, this design might look almost American. The drivewheel spokes were often painted bright red. The top picture at right shows the station at St. Germain, 12 miles from Paris, with a mixture of steam and electric trains. The third-rail system is a suburban line running into Paris. The small train in the cut is on the meter-gauge road running from Nice in southern France through the Alps to the seacoast. The yard scene is in Paris on the French State Railways. The transverse track arrangement is a transfer switch used to move small four-wheeled freight cars sideways from track to track. The bottom photo shows the all-Pullman *Golden Arrow* leaving North Station, Paris, for London. The cars of this train were not ferried across the Channel, although one overnight train was actually ferried.

Lowell Green, Bellows Falls, Vt.

When the Germans advanced again in the Summer of 1942, they had all the work to do over again. General Winter may have had a great deal to do with the failure of Germany's Russian campaign, but, without doubt, generally poor transportation conditions supplied him with an able assistant.

Meanwhile, the pinch was being felt in Germany itself. Some of the slack of inadequate rolling stock for a long war could be taken up by the omission from the Axis countries of hundreds of things which we here regard as absolute necessities of life. Meanwhile, however, the Allies had attained air superiority and bombers began to rain their lethal explosives over the Reich. Our boys and the R. A. F. began attacking trains in Germany and the occupied countries with such success that cars equipped with anti-aircraft guns have now become practically standard equipment on Axis trains.

A locomotive under steam is, incidentally, a most satisfactory bombing target, because, in addition to the destructive quality of the missile hurled at it, the locomotive contains a devastating explosive charge of steam pressure within itself. If the boiler is hit, the resulting explosion doesn't even leave pieces to be picked up.

In addition to attacking trains, usually with light bombers or even pursuit planes, the R. A. F. heavy bombers and our own Flying Fortresses have been giving other Axis railway installations merry hell.

I wish I could tell more of the known effects of all this on the German war effort. I can tell, though, that the effects have been important and far-reaching and are as encouraging to us as they are disheartening to the Axis powers.

Meanwhile, in addition to bombing, sabotage is playing an important role in the occupied countries in disrupting transportation facilities. Trains and bridges are blown up by daring saboteurs who are risking frightful punishment for themselves and their families. In Jugo-Slavia, for example, the death penalty is prescribed for any native found within one kilometer of a railway track, except in cities and towns.

A less dangerous, perhaps, but at the same time a highly effective, form of sabotage is being practiced by the shippers and receivers in the occupied countries and particularly in Holland. Dutch shippers delay the loading of cars just as long as they dare to and receivers do the same with unloading. Even where this only amounts to from 10 minutes to half an hour per car, the over-all effect of patriotic Dutchmen consistently carrying out this practice is really tremendous. The Germans ranted and raved and stormed but, if a trucker walked just a bit more slowly, if a stevedore stopped to spit on his hands before picking up a package and the Dutch boss conveniently failed to see such minor infractions, it was difficult if not impossible for the Germans to detect them unless there was a German watching every trucker and stevedore in the country. This quiet, insidious form of sabotage was the prime cause of the Germans putting all of Holland under martial law.

If the Dutch shippers and receivers are willing to risk their necks to delay cars, surely American shippers and receivers can risk a few gallons of sweat to avoid delay to cars. We have a front—and a very active front—on our own loading or unloading platforms. It is a miniature Guadalcanal, a miniature Tunis, a miniature Bataan!

Milwaukee Public Library collection.

Largest railroad system.

With some 33,000 miles of route (prewar) the German National Railway Company (Reichsbahn) operates the world's largest system of railways under a single management. The system is virtually state ownership with private management, and realizes Bismark's long-time dream of a single German state railway giving primary consideration to political and military considerations rather than to public service. Roughly one-tenth of the mileage is electrified, but this includes most of the heavy-traffic main lines south of Munich, whose immense electrified freight yards are shown at the bottom of the opposite page. The high-speed passenger locomotive shown below is typical of electrified German motive power. The steam locomotive at bottom of page is the first streamlined design in Germany, and was widely touted before the war as the world's fastest steam loco.

Top, C. B. Chapman collection; bottom, German Railroad Information office.

The Reopening of Tunnel

First train through the tunnel was a D&SL passenger train, at 4:53 p. m. December 1.

10

★ Swept by fire September 20, Denver & Salt Lake bore was in use again December 1.

Rio Grande photos by R. B. ("Bud") Hooper.

By Harry Hawes.

"HELLO—hello, dispatcher . . . this is Conductor Pierson—First No. 1, Engine 302. . . . Yeah, Pierson—J. A. Pierson. We're at Quartz—that's it. Say, when we went through Tunnel 10 a few minutes ago, we smelled smoke, and it wasn't engine smoke. . . . I say, it seemed like a different kind of smoke—maybe like some wood burning. . . . Yeah, I know Schneitman . . . you say he's got his B&B gang at Crescent? . . . Yeah . . . . Yeah . . . . That's at milepost 31.08 . . . two miles west of here. . . . O.K. . . . Yeah, I'll tell him to get down there pronto . . . just as soon as I hit Crescent. . . . He's got a pretty fast motor car—ought to make the 3½ miles to the tunnel in nothin' flat. . . . O.K., you're welcome. . . . Thought I'd better play my hunch . . . be on the safe side, you know . . . O.K. . . . goodbye.

"All right, gun 'er, Vaughn—dispatcher wants us to meet Schneitman's B&B outfit at Crescent and get him down to Tunnel 10 as soon as possible."

It was 11:40 a.m. Monday, September 20. Engineer A. E. Vaughn started highballing his three-car passenger train up the two per cent grade—and he was really gunning the 302.

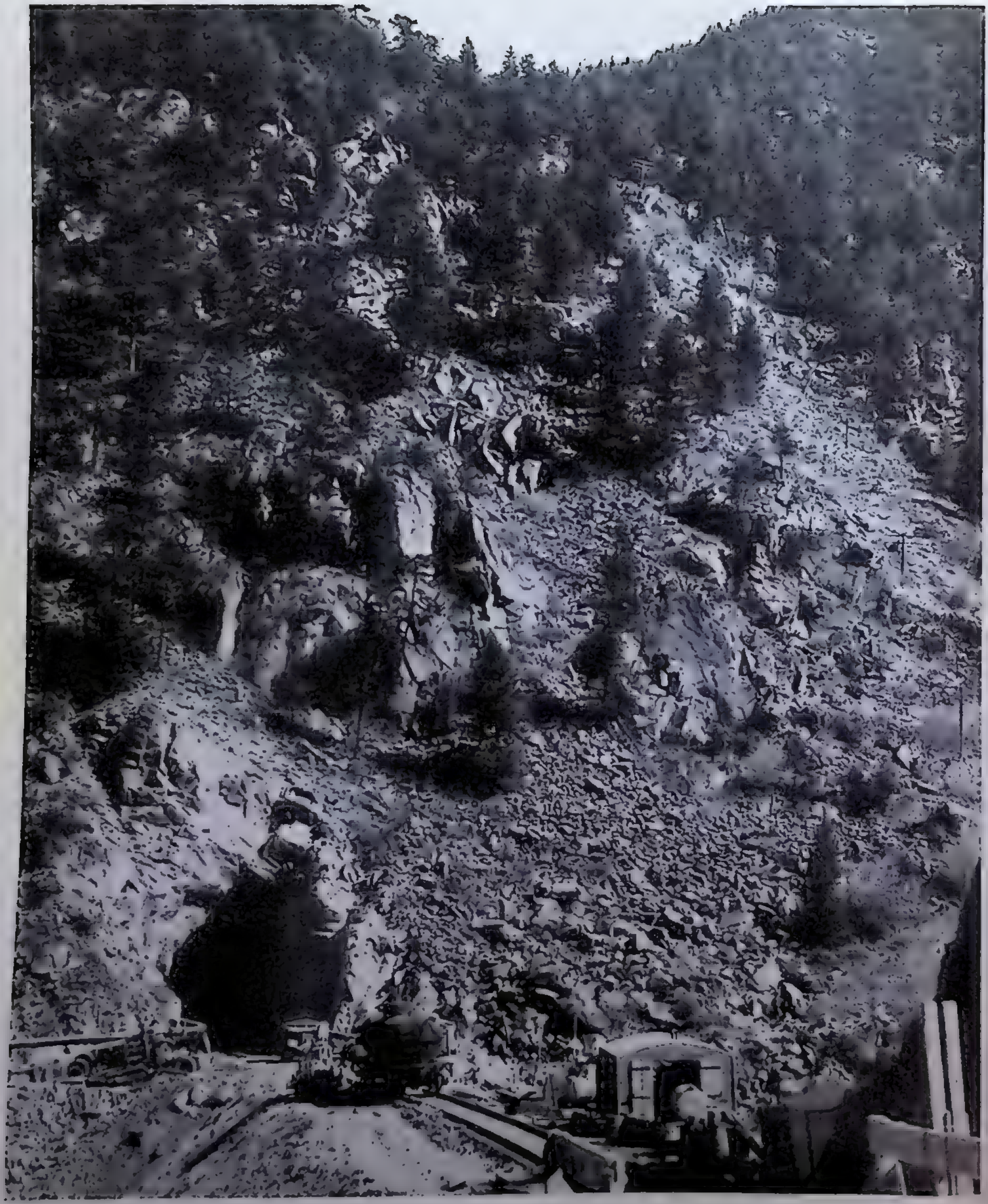
Back in Denver, in the office of J. B. Culbertson, chief dispatcher of the Denver & Salt Lake Railway, a trick dispatcher, F. D. Stephenson, who covers the East End of the D&SL where Tunnel 10 is located, dashed across the hall to the office of A. L. Johnson, veteran of 26 years with the D&SL, including the past 17 as general superintendent. Johnson was about to leave for lunch when the dispatcher advised him of the reported smoke in Tunnel 10.

"Guess I'd better stick around a while till we hear from that B&B gang," he said. "Flash me as soon as you hear, will you?"

At 12:20 p.m., Johnson's phone rang:

"Mr. Johnson, this is Burt Schneitman at Quartz. . . . Tunnel 10 is blazing like fury! . . . Yes, sir. . . . And there's two engines with fire hoses at Crescent. . . . Yes, sir . . . right away!"

Johnson let loose with a barrage of orders to the dispatchers: "Stop all trains in the vicinity of Tunnel 10 and turn them back! . . . Get every



Tunnel 10 as reconstruction began.

After the fire was extinguished among the timbered portions of the tunnel, the scene at its western portal was this. Work equipment had been assembled and the season was Indian Summer. When the tunnel was reopened it was snowing here. Most work equipment was kept at the east portal and at Plainview (opposite page). Notice solid rock portal of tunnel.

Plainview station, 24.45 miles northwest of Denver on the Denver & Salt Lake Railway, borders the Great Plains at the very edge of the Rocky Mountains. Tunnel 10 is 27.42 miles from Denver on the same line, and thus Plainview became headquarters for the men and work equipment which restored the burned-out bore. Here is a work-crew train on a siding at Plainview. Roofs of station structures can be seen at right.

man available to the fire! . . . Get all the water cars you can from east and west!"

Thus, at the height of the lunch hour came the touchoff for what was to be the greatest traffic emergency in the history of the D&SL, as well as of the Denver & Rio Grande Western, which uses the 128-mile stretch of D&SL line between Denver and Orestod for operation of through trains between Denver and Salt Lake City.

The joint line, Denver to Bond, Colo. (just a mile west of Orestod), carries a volume of traffic that is among the heaviest of any comparable area in the West. With currently heavy war freight, the job of avoiding delays in the emergency was monumental.

Fanned from portal to portal of the 1570-foot tunnel by terrific drafts, the flames, of unknown origin, leaped from section to section of the 1129 feet of 12 x 12 timbers and soon created an inferno that made the first effort of fire fighters feeble, indeed.

Johnson learned from the dispatcher that two engines were at Crescent; one was Engine 121, which had pulled a work extra there; the other had arrived light. Knowing that all D&SL engines are equipped with fire hose as precaution against forest fires in the mountains, he ordered both engines to hasten to the tunnel and lend what assistance they could until further help arrived.

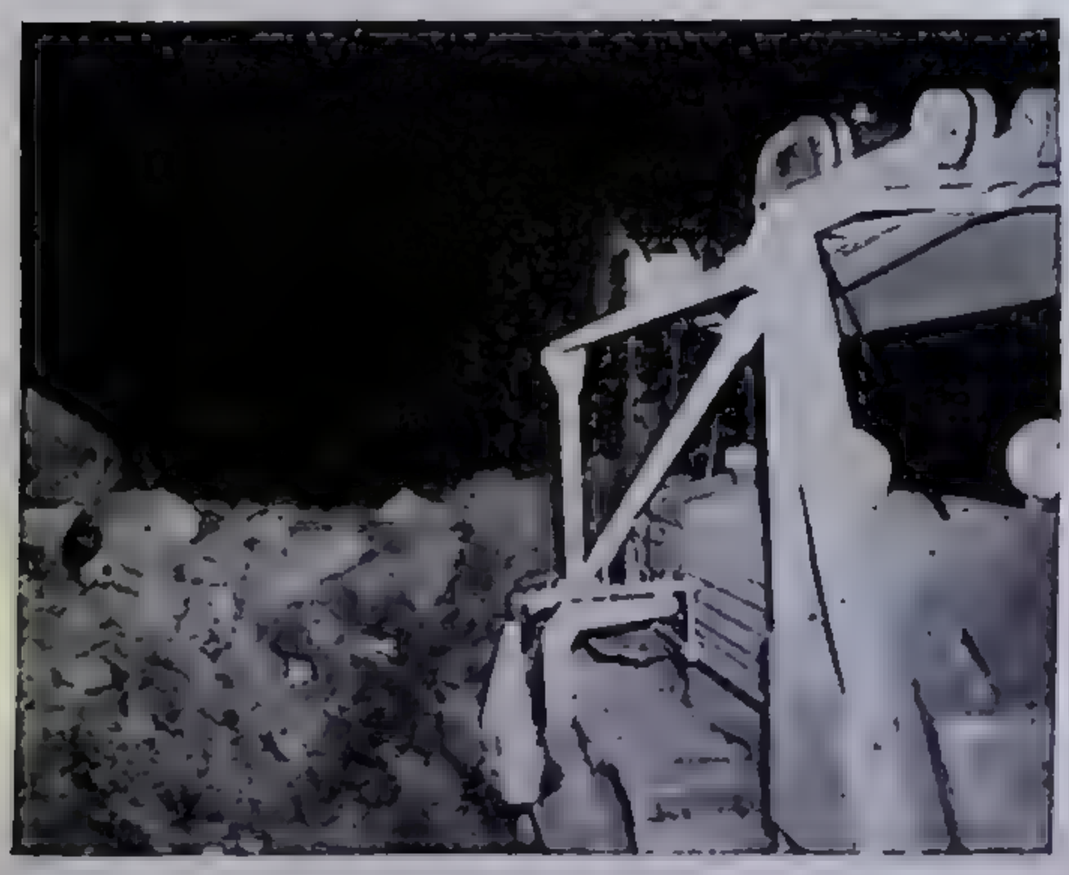
Meanwhile, Johnson contacted Storekeeper William Chappel at Utah Junction, near Denver, and within two hours Chappel had assembled and delivered a trainload of needed lumber and a relief train.

Immediately upon word of the seriousness of the fire, Johnson and the dispatchers had a stream of workmen en route to the tunnel together with tank cars, water cars, fire hose and other equipment, much of which was assembled by the Rio Grande.

The emergency threw a money wrench into the day's traffic machinery. West of the tunnel were the D&SL No. 2 passenger, eastbound, which had to be turned back from Pinecliff, 37 miles from Denver; two long Rio Grande freight trains, which were turned back for detour over the Rio Grande's Royal Gorge Route to Denver; and two light engines. Rio Grande passenger train No. 6 from Salt Lake was ordered detoured via the Gorge before it reached Bond.

A long D&SL stock train was turned back from Pinecliff to Orestod, and the stock trans-

Lightweight Diesel locomotives were used to shuttle work cars and equipment into and out of the tunnel as work progressed. This picture was taken at the east portal. Notice outfit-cars and steam crane on the special siding built for the occasion.



Bulldozers "mucked out" loose rock in the burned portion. Notice rock charred by the tremendous heat in the crown of the tunnel. Below, a train of materials arrives at the west portal. The first all-steel roof arch is being placed in position.

ferred to the Rio Grande for detour via the Royal Gorge to Denver.

On the Denver side of the tunnel were two D&SL military specials, which were quickly sent back to Denver for rerouting over the Rio Grande, two freight extras, and eight other trains whose courses had to be altered due to the fire.

One group of enginemen who received orders to hasten from Bond to Pueblo, where a great rush was created by the sudden thrusting of all through traffic upon that gateway, boarded a night passenger train for the trip. There being no seats in the Pullman or coaches, they crowded into the baggage car and sat on everything from bird cages to egg crates (observing the usual precautions necessary for such a situation).

Speculation as to when the fire could be extinguished and the tunnel reopened ranged from a few hours to several weeks as the train and engine crews swarmed about the eating houses at Bond that night. No one realized at that time the magnitude of the task ahead—nor that it would require 2½ months to restore normal operations.

From the afternoon of September 20 until the afternoon of December 1, the D&SL operated its trains only between Pinecliff and Craig, and Rio Grande trains used the Royal Gorge as a detour. It meant that every train which normally uses the famous Moffat Tunnel and Dotsero Cutoff to Salt Lake had to detour over the route via Pueblo between Denver and Salt Lake, which is 175 miles longer.

To the Rio Grande, it meant the greatest rush ever experienced in the Pueblo yards, as well as at many other points on the Gorge Route. The fire came at a time when traffic over both the D&SL and Rio Grande was approaching its seasonal peak. Furthermore, both roads were hard-pressed for the type of workers necessary to restore Tunnel 10.

Reflecting the sudden traffic jump through the Pueblo gateway, a total of 18,184 cars were successfully handled through the joint Rio Grand-Missouri Pacific yards there within six days after the detouring of traffic, compared with 12,741 during the six days just prior to the detour. This increase of 32 per cent in Pueblo traffic was handled by the same number of employees, switch engines, and other facilities as were in service there before the fire.

Notably at Pueblo, Canon City, Salida, Tennessee Pass and Minturn, Rio Grande employees worked long hours overtime, often

around the clock, to keep traffic moving until relief workers could be dispatched to their aid. Considerable numbers of D&SL employees were sent to the "rescue" in handling the Rio Grande problems at many points.

The fire raged uncontrolled for several days despite locomotives and a Denver Fire Department pumper pouring water into both portals. Firemen were further handicapped by heat within the tunnel, so intense that rock was reduced to molten lava and slag. Workmen were compelled to fight the blaze in 10-minute shifts day and night, due to the blistering temperature of the tunnel's rock walls.

Another problem handicapping the fire fighting was that of carbon monoxide gas caused by the burning timbers. Gas masks were brought into action during the early stages of the fire. Despite precautions, three city firemen were asphyxiated when they ventured too far into the the tunnel.

By the afternoon of the second day, the fire was confining itself to a timbered section about 275 feet inside the eastern portal, and the area was found to be one-third full of debris, including rocks which fell when the timbers burned away.

Quick action by D&SL President Wilson McCarthy, Vice-President E. A. West, and Chief Engineer A. E. Perlman in obtaining outside manpower and equipment enabled the repair job to get into full swing the day after the fire.

"We knew we would have to procure more trained tunnel workers and that such workers were employed on the Big Thompson Water Diversion tunnel not far from the scene of the fire," said McCarthy.

"We stated our case to L. A. West, regional head of the War Manpower Commission; to S. O. Harper, chief engineer of the U. S. Reclamation Bureau and his assistant, Walker Young; and to John Austin, general superintendent of the Lewis J. Stiers Construction Company, which is under contract to build the western end of the Big Thompson project. All were anxious to cooperate, and next morning the veteran tunnel builder, John Austin, was on the job with 100 men. The importance of this graciousness and the patriotic spirit that prompted it cannot be minimized. With this large force of additional workers, the time required to restore the tunnel was greatly shortened."

Certain types of generators, mucking machines and heavy equipment were obtained from various construction firms, mines and

Closeup of steel framework being set in place at mouth of west portal. Below, temporary sheep pens at Rollinsville, where sheep were transferred from railroad cars to a fleet of 31 stock trucks for delivery to Denver during the shutdown of Tunnel 10.

A double-deck truck and trailer, loaded with sheep, speeds its load to the Denver stockyards via the twisting Boulder Canyon Highway (below). A total of 110,130 sheep and lambs billed via D&SL were thus delivered during the Autumn marketing season.

As soon as concrete-lining forms could be removed from the tunnel, track workers laid new ties and rails.

municipalities in Colorado, Utah, Idaho and New Mexico. A number of independent heavy contractors furnished special equipment, and some of it came from the "Deep South."

A giant Diesel generator with a 500-gallon fuel tank arrived in a few days to furnish adequate light and power for the extensive job. A carload of air pipe to provide better ventilation for workers and other needs arrived a few days later.

In addition to all B&B-outfit cars available on the D&SL system, a total of 24 were delivered to the vicinity of the tunnel by the Rio Grande to accommodate the three shifts of workers.

Biggest traffic problem created by the emergency was the arrival of the peak of the Autumn sheep-marketing season in D&SL territory. It was necessary for the railroad to build temporary sheep-loading pens along the right of way at Rollinsville, Colo., in order to effect the transfer of sheep from Rio Grande stock cars to double-deck trucks for the remainder of the trip to Denver. The pens were sufficient to handle as many as 8500 sheep every 24 hours, and a fleet of 31 trucks, rounded up from all sec-

Concrete mixers were mounted on improvised platforms and electricity was generated by portable equipment.

tions of Colorado by the Rio Grande Motorway, a subsidiary of the Rio Grande Railroad, averaged two round trips each daily over the 54-mile Boulder Canyon Highway from Rollinsville to the Denver Union Stockyards.

Despite this handicap, a total of 110,130 sheep and lambs billed via D&SL were delivered to market between September 28 and October 17.

It was not until November 3 that a "pioneer bore" was holed through the slide area of the tunnel to permit circulation of air and the movement of men and materials back and forth from portal to portal. The following day, workmen started erecting the first steel framework needed for support. Two days later a material track-spur was in operation, and on November 12 carpenters began building forms for the concrete lining. All of the tunnel, except about 600 feet of solid rock bore, was to be concrete-lined, similar to the lining of the famous six-mile-long steel-reinforced Moffat Tunnel, 49.6 miles west of Denver.

Not Moffat Tunnel.

Tunnel 10 of the Denver & Salt Lake Railway, which this article concerns, is not to be confused with the famous 6.2-mile Moffat Tunnel which pierces the Continental Divide 49.6 miles west of Denver. Tunnel 10 is 1570 feet long and is located at milepost 27.42 on the D&SL, which is commonly referred to as "The Moffat Line." The Moffat Tunnel is concrete-lined and reinforced with steel.

At 4:53 p.m. December 1, D&SL passenger train No. 1 passed through the rebuilt tunnel en route from Denver, and traffic of both roads moved quickly back to normal, details of the change-over having been thoroughly arranged in advance.

The first long train to move through the tunnel after its restoration was this Denver & Salt Lake coal drag.

Following the old Oregon Trail.

The Union Pacific roughly follows the route of the old Oregon Trail, known to the Indians, developed by early traders, used by the covered wagons of the pioneers.

Over the Rocky Mountains

THE Summit of the Union Pacific Railroad is not on the Continental Divide, which it crosses in the practically level prairie of the Great Divide Basin at about 7000 feet. The summit of 8011 feet is at Sherman Hill, east of the Divide and in the Laramie Mountains. This and the crossing of the Wasatch Range in Utah are the UP's principal grades in the Rocky Mountains, and the high plateau of the Divide lies between. Both grades and summit elevation of Sherman Hill were cut to a minimum for a Rocky Mountain stretch by extensive reconstruction during the Harriman regime. Through Echo and Weber canyons up from the Great Salt Lake Basin to the crest of the Wasatch, the route was almost exactly prescribed by nature, and both Central Pacific and Union Pacific engineers, in competitive surveys, agreed upon the route which is used today. It is here, between Ogden, Utah, and Green River, Wyo., that the "Big Boy" 4-8-8-4 locomotives [pages 22-23], world's largest, use their 7000 horsepower to keep maximum-tonnage freights on schedule. Other photos of UP's Rocky Mountain operations are on following pages.

Mallet.

A true Mallet compound (notice larger front cylinders), this UP 2-8-8-0 is pulling 36 cars up Sherman Hill at about 22 miles per hour. Sherman Hill is just west of Cheyenne, Wyo.

Upgrade in Weber Canyon on the UP.

John W. Maxwel

One of the "Big Boys" leaving Green River, Wy

A Union Pacific 4-8-8-4 on a freight train in Weber Canyon, Utah. The 20 4000-series UP engines (five more on order) are the world's largest, weighing, over the Wasatch M by lighter power, th

Kodachrome by Union Pacific Rail

ms the same freight trains pulled on other divisions
ing switching and breaking up of trains at Ogden
emds of the mountain crossing.

Howard Christiansen, 2039 N. 39th St., Milwaukee, Wis.

The Hiawatha leaving Western Ave., Chicago, on its first trip, May 29, 1935.

Tomorrow's Railroad Today

★ How the Milwaukee Road has eliminated all intermediate slowdowns on an important high-speed line.

By A. C. Kalmbach.

LET'S preview the railroad of tomorrow.

"The super-railroad," says John W. Barriger III, "is a route so intensively developed that maximum-sized freight and passenger trains can cross entire engine districts without consequential intermediate speed reductions." The railroad engineering departments of today know how to develop their routes to such a standard and, in a number of outstanding cases, the job has been done. The Santa Fe has reduced curves and relocated tracks through groups of curves on its Illinois and Missouri divisions to permit more consistent high speed for both passenger and freight trains. The tough spots of the Union Pacific-Southern Pacific Overland Route were ironed out years ago by E. H. Harriman. The Pennsylvania electrification was far more than merely stringing trolley wires; it was the rebuilding of the entire main lines east of Harrisburg into railroads of maximum capacity and consistent high speed. Today, under wartime pressure, the Pennsy is improving its Indianapolis-St. Louis line into a super-railroad by line relocation, centralized traffic control and other means.

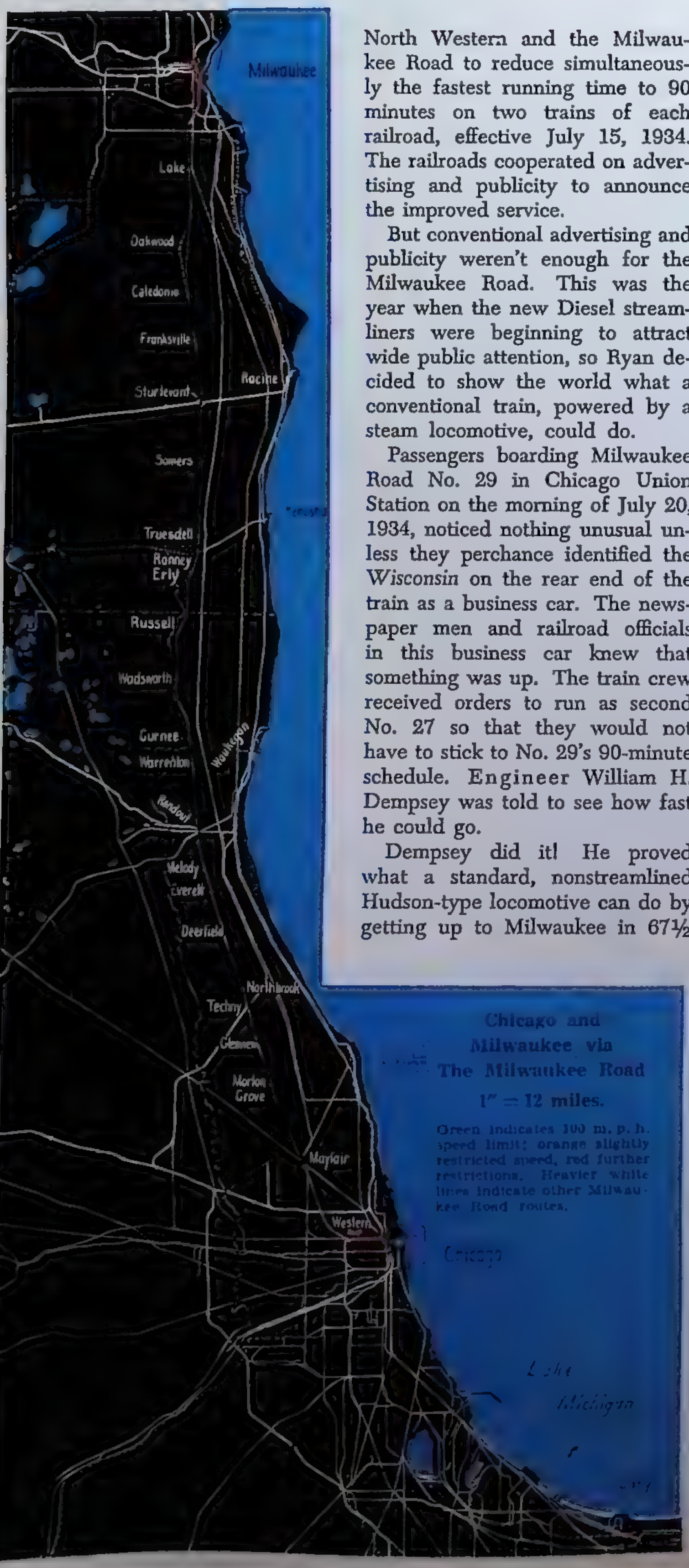
Tomorrow the super-railroad will be common-place. The primary main lines of the nation will then follow the prototype of the major improvement programs of today. The story of what railroads everywhere will be doing to their lines after Victory is the story, for instance, of what the Milwaukee Road has already done to provide between Chicago and Milwaukee the country's fastest stretch of track between metropolitan centers.

The C&M Division was not always fast. Although built through gently rolling country with no major obstacles to good alinement, curves of as much as two degrees were freely used in the original construction. As early as 1907 track was extensively relocated to eliminate and reduce curvature, and in the days of the Eight-Wheelers a track pan was installed at Wadsworth near the midpoint to eliminate a water stop and so permit more consistent speed. Larger tenders took care of the water situation as the years went by and automatic block signaling, installed in 1907, assisted in the speed-with-safety which is the goal of railroad operation. Nevertheless, the fastest schedule over the 85 miles 10 years ago was 1 hour 45 minutes or an average of 48.6 miles per hour, and several trains took two hours. It was a smooth, comfortable run, but very slow by 1944 standards.

After 10 years of intensive improvement, four trains a day make the 85 miles in 75 minutes, or 68 miles per hour start to stop; nine make it in 80 minutes, six in 85 minutes or an even mile-a-minute, four in 90 minutes and only five take longer. Just before the war the timetable was even better. with 14 daily 75-minute trains and five others at a mile a minute or faster. The run is regularly made in as little as 70 minutes, and this is still a smooth, comfortable ride because the brakes are not applied from Western Avenue in Chicago to Kelly's Cut at the Milwaukee city limits.

With high-horsepower locomotives and light trains, a fast schedule can be operated over any reasonably good railroad by running like a scared rabbit on straight (tangent) track, slowing down for curves and crossings, and quickly accelerating after the slowdowns. This makes a seemingly much faster ride, but it is not the most efficient or most comfortable operation. The C&M Division of the Milwaukee went through the jackrabbit stage after the 70 m. p. h. speed limit was first lifted in July, 1934, and after the first 75-minute train, the *Hiawatha*, was established on May 29, 1935. But there is no longer a need for the 116 m. p. h. maximum clocked by Division Superintendent Jack Valentine or the 118 m. p. h. clocked by W. W. Bates, assistant to the superintendent of motive power. Like most main lines of the future, the Milwaukee's crack division is a 100-mile-an-hour railroad on which trains accelerate smoothly out of one terminal to 100 m. p. h., run consistently at that speed all the way to the speed-limit boards coming into the other terminal, and then evenly pull speed down as they come into the yards to the station. No longer are there the famous "Reduce Speed to 90 M. P. H." signs before curves, and no longer may engineers run as fast as they dare on tangent track.

The matter of train speeds between Chicago and Milwaukee came to a head in 1934, but it had been simmering for some time before in the mind of N. A. Ryan, then assistant to the general manager of the Milwaukee Road and now Col. Ryan, deputy chief of transportation in the European theater. Ryan is a high-speed railroader, and he couldn't see why trains shouldn't run nonstop in a lot less than 1 hour 45 minutes over such a potentially busy traffic route as that connecting Chicago and Milwaukee. An agreement was made between the Chicago &



North Western and the Milwaukee Road to reduce simultaneously the fastest running time to 90 minutes on two trains of each railroad, effective July 15, 1934. The railroads cooperated on advertising and publicity to announce the improved service.

But conventional advertising and publicity weren't enough for the Milwaukee Road. This was the year when the new Diesel streamliners were beginning to attract wide public attention, so Ryan decided to show the world what a conventional train, powered by a steam locomotive, could do.

Passengers boarding Milwaukee Road No. 29 in Chicago Union Station on the morning of July 20, 1934, noticed nothing unusual unless they perchance identified the *Wisconsin* on the rear end of the train as a business car. The newspaper men and railroad officials in this business car knew that something was up. The train crew received orders to run as second No. 27 so that they would not have to stick to No. 29's 90-minute schedule. Engineer William H. Dempsey was told to see how fast he could go.

Dempsey did it! He proved what a standard, nonstreamlined Hudson-type locomotive can do by getting up to Milwaukee in 67½ minutes with a 326.8-ton train. The average speed from the Chicago terminal limits to the Milwaukee terminal limits was 89.92 miles per hour, setting a new world record for sustained steam-train speed. The high spot of the run, however, came when the speedometer in the business car hit 103.5 miles per hour at Oakwood, Wis. The newspaper men and the railroad men alike let themselves go at this, and the sole restraining comment was by Columbus Crawford, the porter, who could think only of "Boys, be careful of dem glasses. Dey cost de railroad 35 cents apiece!"

The faster Chicago-Milwaukee service was off to a flying start, publicized in newsreels and newspaper front pages. But occasional stunts do not make a railroad consistently fast. The job had hardly begun. It was not to be a huge improvement program like the Lackawanna Cutoff with miles of new track, tremendous fills and cuts. It was to be, instead, a gradual process of polishing and perfecting a line which already could, for stunts, sustain such record-breaking speeds. Every detail of this 85 miles of railroad had to be checked and rechecked to the nth degree to permit further reductions in the Chicago-Milwaukee running time, for the railroad realized that a 90-minute schedule was not a goal but a step toward a goal.

Before the next faster schedule could come, and it did come on January 20, 1935, with the inauguration of 80-minute trains, curves most obviously needed attention. The banking or superelevation of the outer rail was increased from 2½ inches to 3½ inches. This allowed 90 miles per hour on the one-degree-maximum curves of which the division has quite a number. (A one-degree curve is 5730 feet in radius.)

Before the *Hiawatha* followed some four months later, on a still faster schedule, speed-limit boards began to appear along the division. These were a novelty. Trains had operated under a flat speed limit with special timetable in-

structions for speed over interlockings and other slow spots. Now that speeds were increasing, it became more necessary to give the engineers specific notice in advance of each speed restriction and to insist that the restrictions be obeyed literally. Thus it was that a curious traveler on a 75-mile-an-hour railroad one day spotted freshly painted black and yellow reduce-speed-to-90 signs in advance of many of the curves, symbols of the forthcoming *Hiawatha* era. The new timetable provided for no speed limit on tangent track, but for reductions to the indicated maximum speed at railroad crossings, curves, and other points where speed-reduction boards were placed.

The polishing and perfecting continued. It is not only the degree of curvature and the amount of superelevation which determines how fast a train can comfortably run around curves, but it is the even more important spiral or easement curve which connects the straight track and the curve proper. The term "spiral" is taken from the cubic spiral equation which properly correlates a gradual increase in the banking of the curve and a gradual increase in the curvature itself with the centrifugal force caused by the speed of the train. The superelevation must increase gradually enough so that the passenger doesn't notice any uncomfortable tipping, and at any point during this increase in superelevation the curvature must be just exactly right for the amount of superelevation. As the improvement of the railroad progressed, the length of the easements at each end of every curve was increased so that, at maximum speed, trains were tilted only one-half inch a second as they entered the curve. This was one of the finest points in the polishing process.

To bring the curves finally from 90 to a smooth 100 miles per hour, and thus to eliminate many of those yellow speed boards, the superelevation was changed in 1940 to a maximum of four inches. But this was not the only way to increase the safety and reliability of high-speed operation. Ten years ago switches led off some of the mainline curves between Chicago and Milwaukee. Railroad trackwork used to be rather a cut-and-try proposition. If a switch was needed for a new industry or house track, it was cut into the main line siding wherever it seemed necessary. If a 100-car siding ended at a curve, the switch led into the main track right on the curve. But this is not the way of the modern super-railroad. All six of the switches on C&M Division mainline curves have been removed. Where sidings happened to end at a curve, they have been extended so that the switch can be in the tangent track beyond the curve.

Even on straight track, switches are a disagreeable necessity. Every switch weakens the main line and increases the possibility of accidents.

Twenty-six switches in all were entirely removed from the C&M main line. Once upon a time when a train crew said "A crossover would be useful at the east end of Sturtevant Yards," the crossover was installed. Now, the need for every switch is checked and double-checked. Every crossover or switch to an industry or passing track must definitely prove its value before it can be allowed to interrupt the smooth flow of mainline high iron. Nine pairs of facing- and trailing-point crossovers at strategic intervals between Chicago and Milwaukee provide ample opportunity for special moves. All of these are controlled and protected by interlockings, and the facing points have been electrically locked to eliminate more of the yellow reduce-speed boards which had been necessary when the fast trains were first put on.

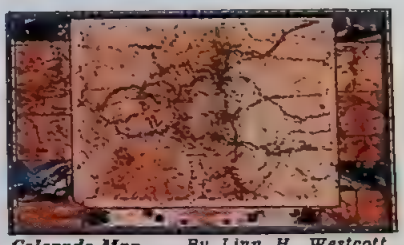
Of course, 70-mile-an-hour signaling is not adequate for 100-mile-an-hour trains, and the block signals deserved and got early attention in the improvement program. The speed capacity of a block-signaling system can be increased in two ways: either by spacing signals farther apart or by providing them with more indications, so that the engineer gets his

Noonday Water Stop *By Gil Reid.*

Watercolor Reproductions

Here are two railroad paintings you'll be proud to frame and hang in your living room! The subjects shown here, as well as the Union Pacific Kodachrome from the center of this month's issue, are beautifully reproduced on heavy coated paper with wide margins, size of picture 14″ x 9″, size of paper 19″ x 12½″. Use the coupon to order now.

Westbound Freight *By Kent Day Coes.*



Colorado Map *By Linn H. Westcott.*

Railroad Maps

TRAINS' new railroad map of Colorado, by our justly well known cartographer, Linn H. Westcott, is without doubt the finest railroad map ever produced. It shows every railroad which operates or ever did operate in the railroad wonderland state. It was checked and double-checked in advance by many Colorado authorities. Lithographed in four colors, 38″ x 24″, with 15 detail inset maps and decorations making it suitable for framing. Thoroughly indexed. Our earlier railroad map of Pennsylvania is just as complete, but without insets or decorations; three colors, 22″ x 17″. Either map or both may be had rolled in tube instead of folded for 50 cents extra.

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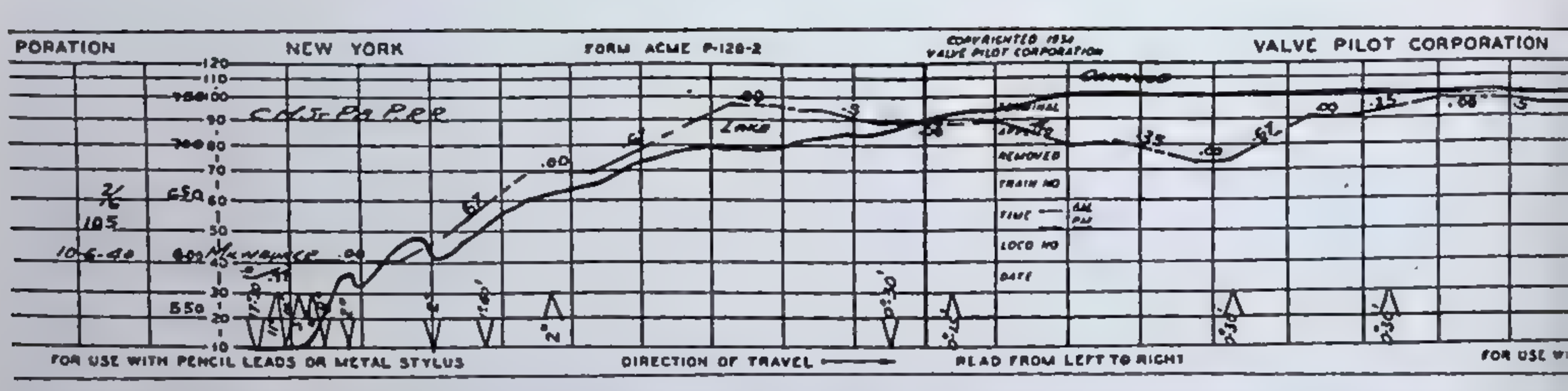


Above and at bottom of page: Typical speedometer tape made by a Hiawatha locomotive on a regular run fro

Henry J. McCord, 112 N. Washington St., Batavia, Ill.

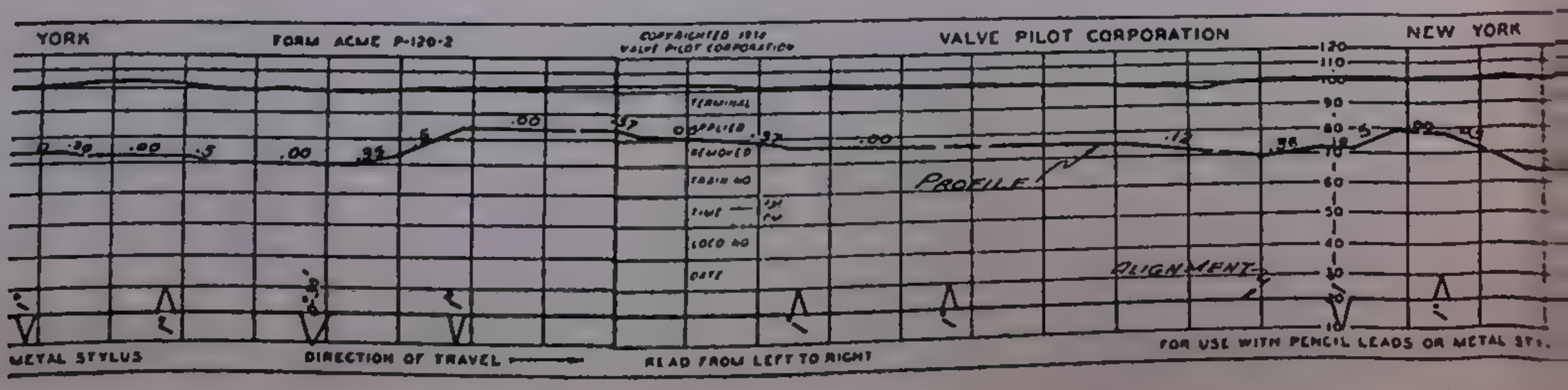
Freight rolls smoother too.

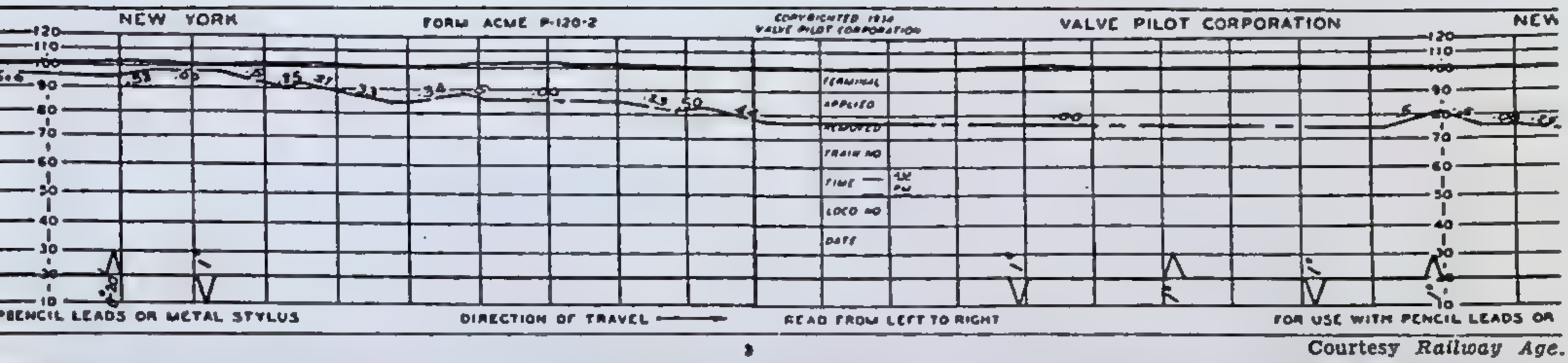
The effects of roadway improvements are most spectacular on passenger schedules, but freight operation is likewise much improved. This 4-8-4 is taking 5000 tons out of Milwaukee.

first warning of an obstruction more signals in advance. The first and simpler method was chosen on the Milwaukee. The three-indication block signals which had been spaced every mile were in most cases respaced at every two miles, simply by removing every other signal. Thus the engineer was given two miles between a yellow caution indication and the red stop signal. The semaphores were provided with focused electric lighting units, so that their color-light indications became visible from a great distance in daylight as well as at night.

Even at the dispatcher's desk the effect of the speed-up was felt. With the faster schedules, minor obstructions and delays to trains become of far greater importance, for it is as hard to make up a one-minute delay now as it was to make up a 10-minute delay 10 years ago. As the physical characteristics of the roadway were perfected, it became more and more necessary to speed up the delivery of orders between dispatcher and train crews, so that the freight trains, especially, could more readily be kept moving without delaying the high-speed first-class traffic. The north end of the division between Sturtevant and Milwaukee has always been particularly busy, since it carries not only the Chicago-Milwaukee trains but also those bound from Milwaukee to Kansas City and Omaha. At Sturtevant, Tower A-68, and Lake, the complicated dispatcher's orders authorizing left-hand track movements of freight or passenger trains were all too frequent. The signal department perfected and modernized this process by installing centralized traffic control between Lake and Sturtevant. With remote control of all switches and signals on this stretch, it's now a simple matter to order trains around each other on the adjacent main strack, and train dispatching is in step with the rest of the super-railroad development.

Even the track structure itself has had to keep pace with the increasing impact of speed. Seventy-





Courtesy *Railway Age.*

Milwaukee to Chicago. Solid black line indicates speed; dotted line, profile of division; angles indicate curvature.

seven track miles of new rail has been laid since 1934 with steel weighing 131 pounds per yard. Some 1.4 miles of 112-pound steel has been laid for test purposes on the high-speed stretch between West Lake Forest and Deerfield, once a race track where derisive motorists would pass up the 60-mile-an-hour trains on the parallel highway. This new rail makes up 51 per cent of the total track of the division. [Part of the mileage into the Chicago terminal is owned by the Chicago Union Station Company.] Now all of the rail is 130-pound or heavier, except for the short-test section. Along with the new rail has come a complete re-ballasting of 97.9 miles with four inches of brand-new gravel. All ties are creosote-treated, giving them longer life and greater strength.

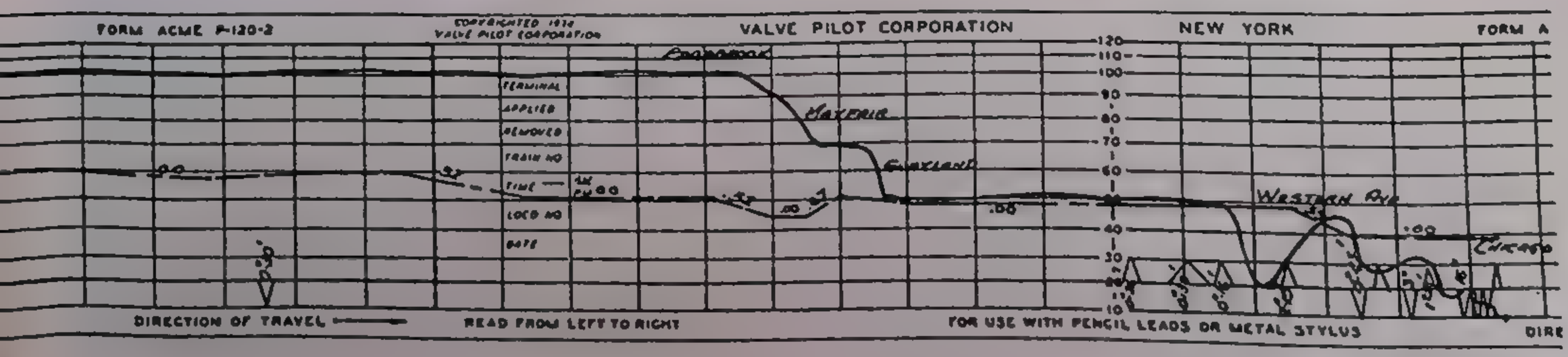
All of the safety planning and all of the modern track of the finest of railroads can, however, be spoiled by something outside the railroads' control—an automobile driven in front of a train at a grade crossing. Ten grade separation projects have removed the possibility of accidents at as many important highway crossings on the C&M main line. Fifteen sets of automatic crossing gates protect traffic at streets in the Chicago suburban areas. Ask the engineer. He'll tell you what peace of mind good crossing protection brings in fast train operation.

It has taken attention to all these little details to make the C&M Division what it is today. Not a single item is spectacular, and yet the schedules of 1944 could not possibly be maintained on the railroad of 10 years ago. The primary factors of improvement have been the increased spacing of signals for higher speed, the proper super-elevation and spiraling of the curves and the heavier rail. These are the same factors which are being polished and perfected the country over to make many ordinary railroads of today into the super-railroads of tomorrow.

On the EJ&E crossing at Rondout.

During the early days of high-speed running between Chicago and Milwaukee, speed reductions were in effect over interlockings, including Rondout, 32 miles north of Chicago, where the Milwaukee crosses the Elgin, Joliet & Eastern at grade. Electric facing-point locks now assure safe operation right through Rondout at 100 miles an hour.

Howard Christiansen.



Night Ride

★ Random thoughts while riding a sleeper west from Schenectady.

Reprinted with permission from *The Monogram*, General Electric Co.

Joe Shea shoved the envelope under the wicket. In it were a ticket good for first-class travel between Schenectady, N. Y., and Waterloo, Ind., and a pink slip which was good for a soft place to sleep. They were good for much more besides. Let us see. Like to travel?

Once the surface of the earth was in general undisturbed by the movement of mankind in the mass, but that was before Americans were invented. Even in peacetime, Americans are ever wanting to go some place—their nervous drive and intensity urges them on. With war, however, the surface of our continent resembles a disturbed ant hill. All is in motion. With motor-car travel suspended, this tremendous burden of maintaining mobility falls almost entirely on the railroads, and, to even the most superficial observer, the work which they are doing is amazing. From freight tonnage to tremendous troop movements, the railroads are handling it all with astounding efficiency and unfailing good nature. You must admire the job our American railroads are doing, night and day, seven days a week, despite depleted manpower and a host of other operating obstacles.

There is a strange stream of warm sentimentality about railroaders. Once a railroader, always a railroader! They have a genuine affection for their equipment, quite similar to the love that horsemen have for their horses. Engines may be just machines, but somehow contact with men endows them with person-

ality, and no two engines, for example, behave exactly alike, although they are identical in anatomy. You can get some great stories from railroad men as they wait between runs, but the best place for yarns is a caboose. Listen to them. They'll throw new light on a picture of magnificent human enterprise, something which is distinctively American.

Here she comes! It's the 8:15 out of New York and she's on time in Schenectady. In the morning she'll put us into Waterloo, and a bus will take us to Fort Wayne. Lester Cook is the conductor. He has been with the road for 40 years. Look at the stripes on his arm! How has he kept his good nature, dealing with the public all these years? And sometimes the public is not easy to deal with—people make you hot under the collar! The answer to this question is significant comment on American railroading. They have made it their business to know how to deal with people.

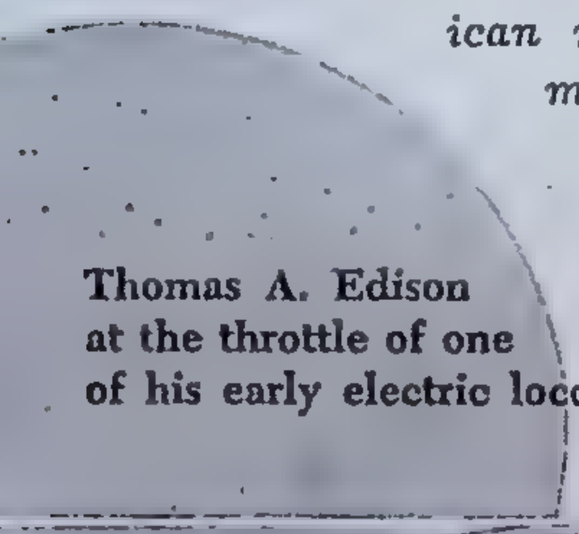
Talk with the conductor, if he has a moment in which to talk. Talk with the brakeman. They'll tell you a lot about railroading, and so will all the people who run these great arterial highways to Victory.

What follows might be the composite of many such conversations.

It seems that the railroads have been preparing for an emergency for the past 20 years. It was in 1923 when they embarked upon a 10-billion-dollar program of modernization. Like facts and figures? Here are a few that are stoppers: There are 23,259 *fewer* miles of railroad line today than there were in 1918, yet the total invested in railroads is one-third *greater* than it was during the First World War, and today they are moving twice as many ton-miles of freight as in the days when *Over There* was a new song.

There are 600,000 *fewer* freight cars in service today than were on the rails in 1918. Well, freight cars carry bigger loads than they did in 1918 because they are bigger, and they work more hours in the day. Even the engines travel farther in a day than they did when St. Mihiel was front-page news—56 per cent farther.

These big hogs can pull heavier loads and keep them rolling much faster. The average



Thomas A. Edison at the throttle of one of his early electric locomotives at Menlo Park, N. J.

A Class S locomotive, now employed as a switcher at the Mott Haven yard.

is about half as much more as the locomotive of 1918 could handle. Now here is an amazing thing: There are fewer locomotives in service today. The year 1917 represented a new peak, for in those 12 months the railroads hauled more tons of freight more miles than they had ever done in one year before. In 1918, 2803 new locomotives were commissioned. Another record year was 1941, but 1942 beat this top by 34 per cent with only 712 new locomotives being placed in service.

The reason for this lies in the long life of the equipment used, plus the marvelous maintenance job being done.

The traffic increase, freight and passenger, was six times as great in '40, '41 and '42 as the increase in the '16, '17 and '18 period, yet the railroads have been permitted to purchase less than one-third as many engines as they did in the days of World War I.

As for passenger travel, in the first three months of 1943 it was virtually double the traffic of the corresponding period of 1918.

So much for figures.

The train cuts through the moonlight that makes the Mohawk hills swim in a luminous haze. The tracks are silver arrows flying into the heart of the West. The soldier-filled Pullman lounge is a little world of its own, detached from the earth, drifting smoothly along its own orbit in space. There is little sense of motion, so smooth is its flight.

The conductor has just passed through, taking up the tickets of passengers on at Utica.

"Why, some of those old G-E electrics that hauled freight and passengers in the First World War are still on the job . . . sure . . . running between Grand Central and Harmon. . . ."

That is a fact! Some of the New York Central's electrics are over 35 years old, and still going strong, hauling longer and heavier trains than they were originally designed to handle. Many of them are still capable of out-pulling a modern steam engine of the same horsepower.

Utica station.

And this brings us to another fascinating story of railroading: the advent of electricity to challenge steam.

The archives tell us that one Thomas Davenport, a blacksmith of Brandon, Vt., in 1835 built a motor and operated a miniature electric railway with it. That was the beginning. In 1839 a Scotsman named Robert Davison, from Aberdeen, drove a five-ton electric locomotive between Edinburgh and Glasgow. Why, that's over 100 years ago!

Then there was Siemens of Berlin, who operated an electric railway in Berlin in 1879. Those were the beginnings. Then came Edison, who built and operated two experimental electric railways at Menlo Park, employing reversed dynamos for driving motors, as Siemens had done, conducting current from dynamos to motors and back again through the rails and wheels.

The first of these, looked at through modern eyes, was a ludicrous affair—a flat car with two long brake handles. The motor was a long-waisted Mary Ann laid on its side. On this, Edison cut through space at the swift pace of 20 miles an hour. The electric engine hauled two cars on which were benches back to back, protected from the elements by gay canvas awnings.

Edison kept at it. In 1882 he had developed two locomotives that would do 40 miles an hour, and in 1883 Edison and Stephen D. Field produced a three-ton locomotive called *Judge* for the Chicago Exposition for Railway Appliances. It drew current from a third rail. It ran 446 miles in the first two weeks and accomplished one definite thing: It set some big people in New York to thinking about electric traction for the Manhattan Elevated.

Syracuse station.

The westbound train is slowing for Syracuse. Our conductor goes up forward as the city lights appear. People have left the lounge. A young officer and a girl are deep in conversation. A middle-aged man is reading Tolstoi's "War and Peace." He looks like someone whose picture we have seen somewhere. The train comes to a stop and the doors clang open.

It was in Baltimore in 1895 that electric locomotives first were placed in trunk-line service. Railroad men's eyes popped as they saw these big electrics haul 44 loaded freight cars and three steam engines upgrade at a steady speed of 12 miles an hour through the B&O tunnel.

Ever hear about the time they spilled the oats? The B&O division superintendent was a skeptic, loyal as all get-out to the old steam hoggers. Couldn't convince him that these new electrics had a drawbar pull equal to that of a steam engine. No, sir! He took a ride on one to see what it would do. The rule was to accelerate gradually as the train left Camden station.

Alco-G. E. Diesel-electric switcher on the Nickel Plate Road.

However, against the advice of the motorman, the superintendent pulled the throttle wide open. The mighty surge of power jerked the entire end out of a box car loaded with oats, scattering the golden grain knee-deep along the track. He was convinced.

In 1898 the Hoboken Shore Road, which operated a two-mile freight terminal line between Weehawken and the huge Hoboken docks of the North German Lloyd, ordered a 540-horsepower, two-truck electric locomotive.

Watching the trial trip as the new locomotive hauled with apparent ease a dead load of nearly 300 tons were officials of every railroad in New York. They were silent in their amazement. Adam's apples moved up and down over ascot ties. Silk tiles were lifted as perspiring brows were gently dabbed—and then someone suggested adjourning to the Union League Club.

New York Central men wasted no time. Here was a double-barreled answer to a double-barreled problem. For 15 blocks along the backbone of Manhattan—cutting through real estate of fabulous potential wealth—ran their tracks. For 24 hours out of each day, through the gulch that now is gleaming Park Avenue, passed 700 locomotives and their cars. This grim gash was like a smoking Etna, belching steam and soot which settled stringily on lace curtains between 42nd Street and the Harlem River. The roar and hiss of the trains was amplified as it rebounded from the brick walls that lined the right of way. Those who lived within the section stared with sleepless eyes at night at the shadows and lights cast on their bedroom walls by the engine fires, and jumped fitfully at the fearful roar.

As the trains passed through the Park Avenue tunnel, firemen lay on the floors of their cabs and peered beneath the smoke to read the dim signals and guide the engineer.

Finally the city adopted an ordinance permanently banning the operation of steam-propelled trains in the city. New York Central was amazed when it found that electrification would save hundreds of thousands of dollars a year and that incalculable fortune lay in the rehabilitation of the real estate.

A project without parallel in railroad history followed. A great terminal would be built at the cost of 40 million dollars. Its yard would handle 3000 trains a day, and there would be ample facilities to handle a flow of 200,000 passengers each day. Forty acres of new real estate were to emerge from the smoking pit. Such was the genesis of Grand Central and modern Park Avenue!

Instead of A. C. and the overhead trolley, the Central's plans called for 660-volt D. C. taken from a shielded third rail.

In 1904 (40 years ago!) General Electric, working with the American Locomotive Company completed the first electric locomotive. It is still in service. She is called *Maude*, or *Old 6000*, although her present number is 100. Look for her some day at Mott Haven.

Maude had her troubles as a youngster. First, the building in which she was being tested caught fire and her wiring went up in flames. She was rewound and the test proceeded. The results were so satisfactory that the Central promptly ordered 46 of her kind.

Motor armatures were mounted directly on the axles and field magnets were embodied in the mechanical structure of the locomotive, producing what is called a gearless job. Each locomotive weighed 95 tons complete with four driving motors totaling 1700 horsepower. By means of a multiple-unit system, locomotives could be coupled together.

The really significant thing is that they drew their power from four steam turbine-generators in a *distant* powerhouse.

Optional routes.

For the benefit of those who must travel but who cannot get accommodations by their usual route, TRAINS will each month print a brief listing and survey of the available routes between larger cities.

Washington and New York:

Baltimore & Ohio—8 trains each way daily, including overnight train with sleeping cars. Via Elizabeth and Plainfield, N. J., Philadelphia and Chester, Pa., Wilmington and Newark, Del., Baltimore and Aberdeen, Md.

Pennsylvania Railroad—33 trains each way daily, including 3 overnight trains with sleeping cars. Via Newark, Elizabeth, and Trenton, N. J., Philadelphia and Chester, Pa., Wilmington, Del., and Baltimore, Md.

Great freights pass by—speeding, shadowy bulks, flat cars with huge boxes destined for the hold of some ship to travel to some faraway land. There is mystery in these great cases, and mastery, too, for in these flying forms are the things which are bringing Victory closer each day. On many of these machines of war is a familiar monogram.

Modern streamlined electric locomotive on the New York, New Haven & Harford.

Yes, you can see these electrical transportation aborigines at work. They are on the Central's books as Class S locomotives and can be identified either by their numbers—100 to 146—painted on their sides, or by their distinctive humped ends. Today their job is to shuttle passenger cars between the Mott Haven yard (that's where the New York, New Haven & Hartford and the New York Central tracks form a Y) and Grand Central. In their youth, however, they hauled all the NYC expresses, and they did it with pride, precision and speed.

It is no reflection on their stamina or ability that they were superseded in 1913 by more powerful jobs. Steel passenger cars had materially increased train weights. The successors are called Class T locomotives. Numbered from 247 to 282, they are the engines which whisk the *Twentieth Century*, the *Empire* and other crack trains between Harmon and 42nd Street.

In 1930 a fleet of freight haulers was built—Class R-2. Powerful and rugged, they may be coupled in pairs when extra pull is needed. At times they take on a passenger train, but mostly they handle freight.

Two less obtrusive types are the Class Q and Class DES-3 locomotives, added to the fleet in 1926 and 1930 respectively. The former, numbered from 150 to 156, have sloping ends and are freight switchers. The latter, numbered 526 to 560, are combination electric-battery-Diesel locomotives used for switching on the West Side Line, and for local freights to Harmon.

A sixth type of locomotive, although it is not

considered as such, is the electric multiple-unit car, which is the motive power for most of the commuter trains. Like the S-type jobs, most of these date back to the first days of electrification. They came from the brilliant inventive mind of Frank Sprague, who conceived the idea of their control—a new principle which permitted control from any car in the train—while he was experimenting with elevator operation in the old Postal Telegraph Building. This control also is used on subway trains.

It's thrilling, and it's amazing, too, to realize that these 167 locomotives are still at work, pulling the peak loads imposed by war. And they have done their job well, and cheaply, for so many years! Constant starting and stopping is tough on armatures. Their average life is supposed to be 10 to 15 years. Only 50 per cent of the armatures on the S and T engines, the aborigines, have needed rewinding, and only five per cent of the later ones. Of course, there has been modernization of controls and some replacement of wiring.

Rochester station.

The moon's shadows have shifted. There are no lights on the roads, except for those of an occasional truck. Even the neon's brazen glare in the small towns has been extinguished. Then comes a flowing green streamer of glow, a factory where men and women are working through the night to produce the implements of war. The train slows up for Rochester. On the station platform are youthful soldiers. Laughing, they swarm aboard. Soldiers with submachine guns guard a darkened train on another track. It is filled with prisoners of war, men who but a month before were sweating in fear of approaching doom. Tonight they sleep in peace and dream of the sunny hills of the Abruzzi.

Did you ever meet Old Van?. Sure, you know him, James Van Der Bogart! His folks have been around the Mohawk and Hudson valleys since the *Half Moon* came up the river. He's bald, wears spectacles, and if you sliced him through almost any place, horizontally or vertically, you'd get a circular cross-section. Well, Van helped build *Old 6000*. When G-E delivered the first 35 locomotives, Van was delivered also. He was made the Central's foreman at High Bridge, the original terminus of the Hudson Division electrification. Up to his retirement three years ago, he had been general foreman at the Harmon electric shops. In this job—his wife claims he was married to it—he ministered to every electric locomotive on the line.

He lives in Ossining now. Man, he's got the yarns to tell! When anything went wrong with one of the electric jobs, a wreck or a short circuit, you'd think there had been a death in the family, but Van always doctored and nursed it back to health and strength.

It's a funny thing, railroad men never think about the millions and millions of miles of smooth sailing, but they always remember the mishaps! There was that night that a T, returning empty to the yards, sideswiped a Q. Both were hurled off the rails, but neither overturned. Van had them behaving in short order, back at work, their brief frolic a thing of the past.

Then there was the time that *Old 6000* was caught in a flash flood which lapped menacingly and submerged four feet of her. She balked. They put a hurry call in for Van Der Bogart. He looked her over, curried and caressed her with a wrench, and in less than 30 minutes she was hurrying up to Harmon at 60. Van had a way with them.

During the First World War we had some really bad weather. Folks at Lisha Kill said it was caused by all the gunpowder being fired in France. Snow, sleet and slush! As the heavily loaded trains tried to make time on the slippery, snowcovered tracks, slush was splashed on the third rail, where it froze and spoiled the contact with the shoe which took the power.

F. W. Butt, the Central's assistant electrical engineer, can tell you how that was remedied. They developed a shoe with a cutting edge that shaved the ice off, neat as a whistle. They still use this shoe in Winter weather.

Did you hear about the sudden disappearance of the track gang's tools? This is a honey! When the Class S jobs went out, it seems that their fields developed such a tremendous magnetism just above the rails that they almost pulled the spikes from the ties. One day some track hands were replaces ties on the elevated section near 125th Street. At the flagman's whistle they dropped their tools and got out of the way as an S engine and train came rolling downtown. The

train passed. The men went back to pick up their tools, but no tools were there. Picks and crowbars had all disappeared. The mystery was solved when the power was turned off at Grand Central. There was a strange clatter. Someone investigated, and there were the tools. Now the armatures and fields are covered with steel shields that confine the scope of the magnetic pull.

Here is another remarkable thing: Even though more than a quarter of a century has passed since these electric locomotives were placed in service, no fundamental changes in original design have been found necessary.

The S engines were designed to haul a 550-ton passenger train at 60 miles an hour. Now they handle 18 modern 80-ton cars in slow-speed transfer service.

The T engines were to haul passenger trains of 1000 tons at 60 miles an hour, now also handle 18 of the 80-ton cars at the same speed in the same service. The R-2's were built to haul 2500 tons of freight, and they now handle 3500 tons with speed and ease. And so it goes! The electrics sired by G. E. not only have grown old gracefully, but they have had the guts to take on even tougher jobs than those which they handled in their youth. By utilizing existing equipment to the limits of its capacity, the railroads of the nation are able to do their magnificent transportation job.

Know who are the greatest shippers in the history of the world? The Army Transportation Corps and the Transportation Division, Bureau of Supplies and Accounts of the Navy Departmen. Ask them about . . .

"What's this, Buffalo? Aren't we going to get any sleep? Look at the time! Well, it's always this way. You never know when to go to bed when you start talking railroad."

Buffalo station.

GEORGE S. FINLEY *and his Stars*

This alert and genial "North Western" conductor is proud of his stars, as well he might be. The four displayed on the lapel of his coat are for his sons in service—Henry, Edward, George and Bob; the two on his sleeve identify him as a "North Western" 50-year service man—50 years with less than 50 days lost!

While Finley, in his "North Western" uniform of blue, is busy on his run between Sioux City and Omaha, his sons, wearing the uniform of Uncle Sam, are busy in the armed forces. Henry is a first lieutenant, detailed to special service. Private Edward is overseas, while George is in the Commando Division at Camp Hale, Colorado. Sergeant Bob is in the Air Corps at Reading, Pa.

But Mr. Finley's sons are not the only members of the family in service. His son-in-law, Captain F. T. Lynde, is in the Railroad Division in faraway Iran, while a daughter-in-law, Edward's wife, is an airplane inspector in California.

The Finleys are typical of all other members of "North Western's" Family Circle in that they are fighting for a principle, the essence of which is freedom. They are firm in their resolve to help deliver a knock-out blow to the forces of evil—on the Transportation Front as well as on the Fighting Front.

Thanks to such efforts as theirs America and her railroads continue to do an outstanding war-time job.

CNR to Build New Line

PLANS for a 15-mile line from Eastern Junction to Boute-de-L'ile on the Island of Montreal have been announced by R. C. Vaughn, chairman and president of the Canadian National Railways. Construction of this line was approved by the Canadian Parliament, but work has been deferred because of wartime conditions.

Eastern Junction lies midway between the municipalities of Mount Royal and St. Laurent and is the point where the St. Eustache-Laurentian Mountain line of the company meets the freight transfer line to the marshaling yards at Turcot. Bout-de-L'ile is at the northeast tip of the Island of Montreal where the Quebec-Lake St. John district line of the Canadian National crosses Riviere des Prairies to the north shore of the St. Lawrence River.

The contemplated line, which will be constructed at an elevation providing the most modern type of grade separation, will open a new residential and industrial area in Montreal and will permit passenger trains operating between Montreal and the Chicoutimi, Lake St. John and Abitibi districts direct access to the new Canadian National Central Station. As a further convenience to east-end residents, consideration is being given to establishing a station on the new line at a convenient point between the city and Bout-de-L'ile.

Not only will the new line make additional industrial sites available along the Rivier des Prairies (the Back River) but it will also provide speedier freight service for industries in the Longue Pointe area. It will shorten by 76 miles the distance freight must travel from that area to the Turcot marshaling yards over the existing route via Joliette. It will shorten by 24 miles the route covered by freight moving between the west end of Montreal and points on the North Shore east and north of Joliette.

These mileage reductions will result in substantial reductions of operating costs.

The building of the new line will allow the Canadian National Railways to exercise the authority provided by the Board of Transport Commissioners in 1940 for the abandonment of 32 miles of the Montfort-Joliette line. The abandonment of this line will result in the recovery of 6200 tons of steel as compared with the 6000 tons needed to build the new line.

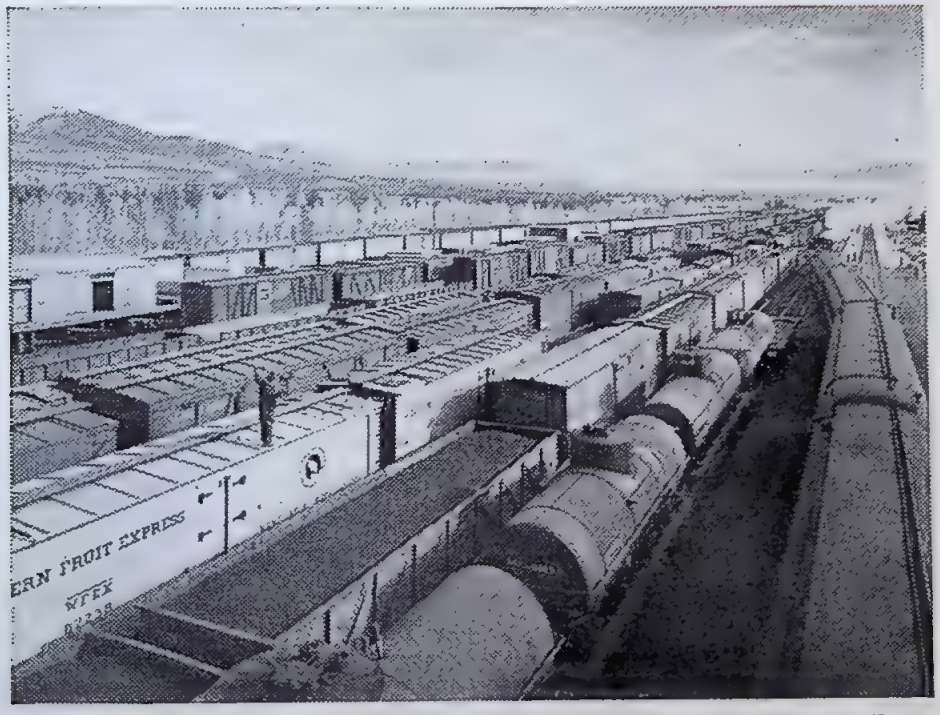
The route for the Eastern Junction—Boute-de-L'ile line has been surveyed and the land acquired or expropriated. The job is estimated to cost $2,870,000 and, it is hoped, will be completed during 1944.

10 for the Nickel Plate

Ready to do their part in handling the heaviest traffic The New York, Chicago & St. Louis Railroad Company has ever known, 10 new Lima-built 2-8-4 locomotives have gone into wartime service. Lima is now shipping 15 more of these locomotives, and an additional 15 are under construction.

LIMA LOCOMOTIVE WORKS INCORPORATED

Lima Locomotive Works, Incorporated, Lima, O.



Here is a crowded division terminal "somewhere" along the Great Northern railway. Day and night a procession of long freight trains roll into these terminals from east and west. Trains are inspected, repairs effected, cars regrouped. A carefully groomed engine backs on, and the train resumes its journey with a new crew. Most of the freight is destined to cause many varieties of trouble for Uncle Sam's enemies.

SWOLLEN PROFITS?

There has been so much talk about wages and profits that perhaps you would be interested in knowing how much money the Great Northern Railway is making out of the war. Its net income for 1943 will be about 18 million dollars. This amount is *less* than the railway's net income for 18 of the 20 years from 1911 to 1930, a period which included good years and poor ones and the first World War.

But most surprising is the fact that the Great Northern's business in 1943 was just about double what it was for the average of the years of the first World War and for the average of the 20 years from 1911 to 1930.

War taxes, of course, are the principal reason for the smaller net income. The Great Northern's taxes for 1943 come close to 50 million dollars. That is one-fourth of the railway's gross income for the year. During the first World War, the Great Northern's taxes averaged about 7 million dollars a year.

Besides the smaller net income for the past year, huge expenditures must eventually be made to repair locomotives, cars, tracks and other property that is being worn out by the heavy war-time traffic. These expenditures ordinarily would be made from current earnings, but they have had to be deferred because of the shortage of materials and manpower. Meanwhile the money represented by these deferred expenditures appears as "profit" and is being syphoned off by war-time taxes.

Dividends paid by the Great Northern during the years from 1911 to 1930 averaged $6 per share. During 1943 the owners of the Great Northern received $2 per share, the same as in other recent years. Thus, while the volume of services performed by their railway has doubled, their returns have shrunk to one-third of what they received over the earlier 20-year period.

The Great Northern would like to have these facts known by the people who live in the communities served by its lines, and particularly by those who depend upon its facilities for their transportation requirements and favor it with their patronage.

GREAT NORTHERN RAILWAY

By Edward Hungerford:

The Man in the Tower

A RUGGED American type is the man who for the past eight or ten years has commanded the fortunes of the more-or-less-affiliated Boston & Maine and Maine Central railroads, and who, in so doing, has made himself an outstanding figure throughout northern New England. He is stocky, heavy-browed, affable, with a pleasant gleam in the eyes behind the lenses. He meets every man on precisely the same basis—friendship from the outset. His men invariably respect him, and that is about all that one has a right to expect from a New Englander. They respect him not alone for his firmness and his ability, but for the fact that he has tackled a big job and made a success of it. In New England that counts for a great deal.

There was a time, and that time was not so long ago, when both Boston & Maine and Maine Central were in a pretty precarious position. They were sharing the fate of most of the railroads in the far northeastern corner of the country—all of them, with the single exception of the Bangor & Aroostook way up in the northern tip of Maine. They were, at best, "short-haul" roads; and that was a terrible handicap. The day of the "small railroad" in the United States seemed to have come to an end.

Edward S. French was a "small-railroad" man. Son of a former traffic officer of Boston & Maine, he began by taking the 96-mile St. Johnsbury & Lake Champlain—a streak of rust running across northern Vermont—saving it from utter bankruptcy, and by hard work and good salesmanship and careful management making it earn money for itself, which it still is doing. He took other small New England roads and with them accomplished various successful things.

"The formula is not difficult," he has said. "In my mind it always has been a cardinal principle of railroads that you cannot run a railroad successfully through hostile territory." That's typically French. It's French, too, when he adds: "A railroad isn't just a mechanical thing. It's run by human beings. That's what we're trying to make people understand, and I think that everybody's a lot happier because of it."

Edward S. French literally was born to the railroad—to the Boston & Maine, if you please. His father for years was a traffic officer on the line. The son worked his way through Dartmouth College and today is a trustee of Dartmouth. Ernest M. Hopkins is the present president of the substantial old college, and is cut pretty much from the same piece of cloth. So it happens that Hopkins is a director of Boston & Maine—a good working combination.

How well French works was shown, not so many months ago, when the road had to achieve a rather difficult job of refinancing. French was determined that his property should not go through the bankruptcy wringer. He had worked too hard to give up; had made it almost the first railroad in the land to correlate its services with its own bus lines and air lines; had made New England trust and patronize it once again. So he went down to Washington and secured 26 million dollars from the Reconstruction Finance Corporation. That gave him just enough to pay $300 cash on each $1000 bond, with a little spare change for the thin treasury of Boston & Maine. The other $700 would be made up of a new issue of bonds, if the bondholders would consent to it. Although they were scattered all over the world, most bondholders were in New England. They knew French and trusted him. So it was that 95 per cent of the cautious bondholders of the road voted for his plan. (It is to be noted that in New England the vote was over 99 per cent.) Boston & Maine was saved from bankruptcy and made fit for the big war job just ahead.

NOT long ago the Man in the Tower was privileged to ride over the Boston & Maine with its president and a few of its officers. To him it was a revelation. The trip began at Troy, one of the two chief western terminals of its Fitchburg main stem, and, incidentally, the line of greatest traffic density of the French principality. On the preceding day 1626 cars of freight (22 trains) had moved eastward over it from Mechanicville, where it has its chief connection from the West with the Delaware & Hudson and the New York Central. That was just 16 cars less than the line's one-day record, made in 1942. At 10 o'clock of the morning that we journeyed over the old Fitchburg, the road was doing one of the heaviest wartime businesses in the land. Three hundred-odd cars already had begun their 200-mile trek to the sea over what French laughingly described as the crookedest railroad in the United States east of the Rocky Mountains. Be-

Edward S. French.

tween Mechanicville and Boston its curvature amounts to 50 complete track circles. But grades are not too bad. The line is double-track for practically its entire length, and it is perhaps the most efficiently operated heavily traveled traffic line in all of New England.

Despite the double track, it is operated by centralized train control all the way from Boston to the Hoosac Tunnel—140 miles; signaled so that either track may be used in either direction at the discretion of the dispatchers, of whom there are three between Boston and the west portal of the great tunnel.

In other days, although the double track continued through the 4½-mile bore, it never was considered advisable to have more than one train in the tunnel at a time, because of ventilation conditions. The advent of electric power within it, 33 years ago, rendered this precaution no longer necessary. Today there may be as many as four trains within it on both of its tracks at a single time with no trouble whatsoever from smoke or gases. Steam locomotives still go through it with banked fires, but idle up and down its easy grades to the summit at the center of the bore. At this point, a shaft 1028 feet in height leads up to the summit of Hoosac Mountain. There are electric fans at the top of the shaft, and at a word from the dispatcher at the west portal of the tunnel these powerful fans are placed in operation and quickly clear the air far below. It is hard to realize that this Hoosac Tunnel, carved through solid rock and first opened in 1875, took 20 years to complete and cost many lives before it was done. It was bitterly opposed, an object of much scandal; and before it was completed the Commonwealth of Massachusetts had to take over its construction and finish it at a total cost of 14 million dollars. For many years the longest railroad tunnel on the North American continent, it has justified its construction many times over.

"WHEN we get all these babies into service," said French to the Man in the Tower, "we shall be able to get rid of these nine miles of electric operation and so save a considerable amount of money for the Boston & Maine. . . ."

"These babies" are the new Diesels of which the Boston & Maine has ordered 12, the first two of them arriving last October and going immediately into service. Each engine consists of two 270-horsepower units and cost approximately half a million dollars, or about twice as much as steam locomotives of similar power. The plan is that each of them, pulling a hundred cars at a sustained speed of 45 miles an hour, will double the line each day (twice a day if it becomes necessary). To handle a road of this traffic density with 12 locomotives, and with a great saving of time to boot, is nothing less than a railroad triumph. If pressed, Ned French will tell you so himself.

He is passing proud of the job that has been done on his two correlated but entirely separate roads, and he has a right to be. Time was when the Boston & Maine and the Maine Central, which feed traffic to one another, were under a single-ownership control. Those were the days when powerful financial forces were at work to bring all of the roads of New England save the Boston & Albany and the Central Vermont under a single ownership and control. In many ways, the plan was essentially sound; chiefly it was the method that was being used to bring it about that was under justifiable criticism. When the entire business fell through, the Maine Central and the Boston & Maine found themselves completely divorced. Most of New England rejoiced.

But the interdependence of one road on the other did not cease. While the heavy-density line of the Boston & Maine is and will remain its Fitchburg line to the west through the Hoosac Tunnel, it also has a heavy traffic over two main stems north from Boston to Portland (a little more than a hundred miles distant), as well as two lines reaching on toward Montreal. At Portland there is close connection with the Maine Central to the Canadian Line, over 250 miles distant, and, by connection with the Canadian roads, on to New Brunswick and to Nova Scotia. Most of the trains run through much of the time without changing engines. They all look alike. Both Boston & Maine and Maine Central recently have adopted a handsome tuscan-red livery for their passenger equipment, a welcome change from the dreary "Pullman green" of other days.

The two roads share general offices, who have their headquarters in North Station, Boston, save that the Maine Central has an executive vice-president of its own, located at Portland. The Maine Central is only half the length of the Boston & Maine (about a thousand route-miles of line all told), and its gross earnings at the present moment come to only about 14 million dollars as compared with the 36 million dollars of its former spouse. But it is a stout and hardy little road, and in the excellence of its operation it reflects the shrewd judgment of Edward S. French. Both line and mobile equipment are well maintained and it is worthy of record that in 1943 it earned about $6 a share on its common stock, which is just about the quoted market price.

THERE is a lot more that the Man in the Tower wishes to tell about Ned French and his remarkable pair of railroads, a lot more about the human side of this Yankee railroader. But that will have to go over until another issue of TRAINS. Suffice it now to say that French has created not one, but two, railroads of real personality. Any New Englander who knows his baked beans will tell you that. Upon occasion he has had to do some pretty unpleasant things; sometimes to close down passenger service entirely on a side line and abandon others completely — all in the interest of economy and of getting the roads to stand firmly upon their feet once again. But, on the other hand, he has developed their service—both passenger and freight—to an extent that would not have seemed remotely possible a dozen years ago. He believes ardently in the future of his railroads. He is not a defeatist. He has brought new life and vitality into two essential properties which until a short time ago seemed to be dying on their feet. For all of this he has earned the gratitude not only of New England, but of the railroad world everywhere.

Edward Hungerford

SQUEEZE THAT MONEY BROTHER ... IT'S MINE TOO!

SURE, that Saturday night pay envelope's bulging. But let me tell you something, brother, before you spend a dime . . . *That money's mine too!*

I can take it. The mess out here. And missing my wife and kid.

What I *can't* take is you making it tougher for me. Or my widow, if that's how it goes. And, brother, it *will* make it tough—if you splurge one dime tonight.

You're working . . . and *I'm fighting* . . . for the same thing. But *you* could lose it for both of us—without thinking. A guy like you could start bidding me right out of the picture tonight. And my wife and kid. There not being as much as everybody'd like to buy—and you having more green stuff than I. But remember this, brother—everything you buy helps to send prices kiting. Up. UP. AND UP. Till that fat pay envelope can't buy you a square meal.

Stop spending. For yourself. *Your* kids. And mine. That, brother, is sense. Not sacrifice.

Know what I'd do with that dough . . . if I'd the luck to have it?

I'd buy War Bonds—and, God, would *I* hang on to them! (Bonds buy guns—and give you four bucks for your three!) . . . I'd pay back that insurance loan from when Mollie had the baby . . . I'd pony up for taxes cheerfully (knowing they're the cheapest way to pay for this war) . . . I'd sock some in the savings bank, while I could . . . I'd lift a load off my mind with more life insurance.

And I wouldn't buy a shoelace till I'd looked myself square in the eye and knew I couldn't do without. (You get to knowin'—out here—what you can do without.)

I wouldn't try to profit from this war—and I wouldn't ask more for anything I had to sell.

I've got your future in my rifle hand, brother. But you've got both of ours, in the inside of that stuffed-up envelope. You and all the other guys that are lookin' at the Main Street shops tonight.

Squeeze that money, brother. It's got blood on it!

Use it up
Wear it out
Make it do
Or do without

A UNITED STATES WAR MESSAGE PREPARED BY THE WAR ADVERTISING COUNCIL; APPROVED BY THE OFFICE OF WAR INFORMATION; AND CONTRIBUTED BY THE MAGAZINE PUBLISHERS OF AMERICA

Correspondence

It is my opinion that H. B. Kritzwiser of Va
what mistaken if he considers Canadian dir
been as seriously affected by the war as have
diners. I rode the CNR from Vancouver to
the CPR from Edmonton to Calgary, Banff and
You can eat three times a day on the CNR an
if you wish. . . . I had to wait for dinner and
once. That was on the CPR. With the entree c
ever, they served three vegetables, each in its
The usual custom was to serve only two on the di
also at Banff and Lake Louise.

Dudley W. Thickens, Rt. 2, Walnut Cree.

The Pennsy out of Washington (D. C.) on a Saturday
really undertakes to move a major portion of the popul
into New York City for the weekend . . . two sections . . .
32 cars with packed aisles and vestibules of standees. Why do I always get a seat, only to have several gray-haired ladies pause in the aisle beside me? Well, standing four hours to New York was not too bad on the feet, and there was a lot of good-natured banter throughout the coach. The new girl porters, or tidy-uppers, really have a tough time doing much picking up because the cheery waiters sell sandwiches and milk so fast that wrappers and containers are everywhere.

Lt. W. C. Moore, U. S. N. R., 27 Norwood Rd., West Hartford, Conn.

Your Colorado Album of Photographs, which I and my friends in Colorado have enjoyed, omits pictures and history of the famous Royal Gorge. This was one of the most famed scenic grandeurs of the D&RGW, especially the hanging bridge which, in narrow-gauge days, did hang. I fired an engine out of Pueblo when the two daylight trains west, Nos. 1 and 5, stopped 10 minutes in the Gorge for passengers to gape and wonder. After the company standard-gauged the road, they filled under the bridge with concrete and riprap.

Arthur J. Pike, 124 N. W. 22nd Pl., Portland, Ore.

I have been in the army for over a year now and have traveled about 500 miles, always making it a point to see all shops, roundhouses, etc. wherever I happen to be stationed or visit. Have seen some pretty strange equipment, also many kinds of locomotives, and must say I am always treated fine whenever I visit the shops and roundhouses. There is not a better bunch of men than railroaders.

Kenneth W. Ackerly, Rosecrans Field, St. Joseph, Mo.

I have been wondering whether there are any records still in existence anywhere that would give the dimensions of the big wooden trestle which was illustrated in your article on the old Colorado Midland and which made up about half of the third hairpin in the Midland Loop. It's very difficult to figure out now, due to the fact that the trestle curved and apparently kept right on climbing at something like three per cent. As nearly as I can remember from the time that I was up there about five years ago, the trestle was built for almost its entire length over soft, boggy ground. Many of the foundation timbers are still in position. Big, soft pine logs about two feet in diameter, and 30 feet long, were spaced about 15 feet apart. They appear to have been laid in trenches about a foot deep, and then the trestle was nailed together on top of them. The site is littered with hundreds of old-style square-cut nails, some of them almost two feet long. Considering its height, I'm afraid that trestle wasn't a very substantial structure.

Carl B. Hewett, 2511 Front View Cres., Denver, Colo.

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March

1944

25¢

th
Photo
as all rai
are being che
ties, the drawing
corrections are made, th
its final size on a lithograp
printed in a very limited edition to be
to various authorities for further checking. At the same time an additional black print is made on illustration board, and this becomes the master drawing. Besides this, three other boards are printed in pale blue ink and on these are drawn the various lines and letters to appear in color. The plate that was used to make these originals is not used any more, as further corrections make it useless.

After all colored drawings have been completed, using the pale blue lines as a guide to insure that each color lies in the right place, a set of lithographic proof plates is made only for the purpose of proofing in color. By this time, the map has been corrected fairly thoroughly and few changes are left to be made before the final printing plates are produced. All this takes at least three months from the time the first lines were drawn on paper.

Maps of other states are on the way now.

Have you bought your extra war bond in the Fourth War Loan Drive?

Feature in March TRAINS will be the story of Chicago Union Station, one of the busiest railroad crossroads of the continent. Too large and too lonesome in the mid-thirties, Chicago Union Station is now badly pressed by wartime traffic, and the director in South Tower says if the Pennsy adds any more sections the management had better add a couple of tracks, perhaps in the Chicago River, the nearest empty space!

Kalmbach Publishing Co.
1027 N. 7th St. Milwaukee 3, Wis.

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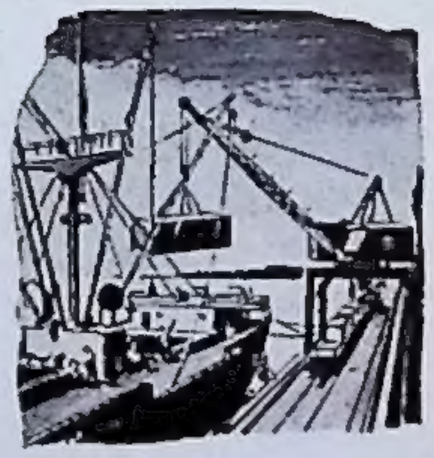
is the record of the American railroads.

In the year just ended, they handled a volume of traffic which dwarfs anything in the history of transportation.

And this job was done — not under the arrogant compulsion of dictatorship, but by voluntary cooperation in the finest American tradition.

There was first of all, the cooperation of railroad men and railroad companies with one another.

There was the surpassing cooperation of shippers and receivers of freight, who did their indispensable part in keeping freight cars on the move.



There was the helpful cooperation of government agencies with railroad management.

And there was, on top of all this, the cooperation of the Army and Navy—the greatest shippers in the world.

Without all these, the record would never have been possible.

And finally, there was the friendly and patient cooperation of the traveling public—which accepted the inconveniences, and sometimes the hardships, of wartime travel, with typical American good humor and good sense.

So far have we come together along the road to victory. The road ahead calls for still more effort, still closer cooperation, in getting the utmost transportation service out of our railroad plant.

And when the victory is won — as surely it shall be—it will have been won by free men, working together under the rules free men established for themselves—the thing we are fighting to preserve.

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